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**MOTIVATIONAL EFFECTS OF ALTERNATIVE  
DECISION-MAKING PROCESSES IN GROUPS**

by

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The present study takes its departure from the general position that a social group constitutes a special type of psychological environment for the individual, and that this environment differs in significant ways from the environment of the isolated individual. Motivational theory is based in the main on the study of the individual in isolation, and we attempt here to reexamine the operation of motivational processes in the light of the person interacting with the group.

The experiment reported here is the third of a series designed to make this sort of reexamination. In the first experiment (5) we considered the fact that as a group takes action toward its goals, members may find themselves in new situations even though they have taken no personal action. In this type of environment, therefore, a member may find himself "carried" by the group towards or away from his personal goals or avoidances by the "ground moving under his feet." We were able in this study to establish a number of relationships between the environmental circumstances of a group's moving with respect to its goals and the reduction or increase of motivational tensions in the individual.

In the second experiment (6) in this series we examined the effects of being "carried" in a group environment on the relation between

decision-making and motivation. Experimental studies with isolated individuals assume that if the person is acting toward a goal, and engages in one of two alternative courses of action, he has made a decision between the alternatives. In a group situation, however, the person may find himself obliged to engage in one of the alternative courses of action while he is still in a state of indecision--that is he may be "carried" beyond the point of decision before he has made up his mind. We inquired in the second experiment into the motivational consequences of being obliged to act while still in a state of indecision. We hypothesized--and were able to confirm--a relationship between making or not making a decision and the way the person channels motivational energy: if, in the group situation, the person is allowed to make a decision, motivational tensions tend to be channeled into action; if decision-making is short-circuited, tensions tend to be channeled into wish-fulfillment.

Whereas the preceding experiment dealt with decision-making between alternative paths to a goal, the experiment reported here deals with decision-making between alternative goals, with the path fixed. In group life, again in contrast to the situation of the isolated individual, some line of action may be required of the person although he has not decided what goal this action serves. An example of the general type of effect one may expect in this situation is given in Durkheim's Suicide (2). Durkheim discusses the paradoxical fact that with a sudden rise in economic prosperity the suicide rate tends to increase. His interpretation of this phenomenon may be paraphrased as follows: a middle-class individual engaged in business activity sees this activity as serving certain economic goals; if he makes \$10,000 in one year, he tends to raise his level of aspiration in accordance with the norms of his group, say, to \$12,000; the norms of his group however do not apply beyond a \$25,000 limit,

and if with business prosperity he now finds himself earning \$30,000 a year, he is operating in a situation of normlessness, or "anomie"; he no longer has any basis for setting reasonable goals which will be served by his business activities; in the absence of a goal these activities become "meaningless" to him; and if they are sufficiently central in his life, he will become increasingly disposed to suicide.

The classic investigation of "meaningless" activity was carried out by Karsten (7) in the psychological laboratory. Karsten examined the conditions under which "psychological oversatiation" occurred as the subject worked continually on a repetitive task. An example of her procedure is given in the following case: a subject was asked to write his name over and over again; as he filled out page after page his boredom grew more and more intense; the subject complained of aches in his arm; his writing deteriorated to the point of illegibility; and finally he reported, despite the experimenter's urging him to continue, that his arm felt paralyzed, and that he was physically incapable of writing his name again. Karsten then collected the pages on which the subject had been writing, put them into an envelope, and asked him to sign his name on the envelope; he was able to do this both effortlessly and legibly. Karsten interprets his new-found ability to perform the activity as indicating that once the activity became connected with a goal, it was no longer "meaningless" for the subject, and therefore no longer satiating.

Numerous social psychologists since Durkheim have documented the fact that groups can provide "social reality" which individuals use in making judgments (11). If the person is engaged in setting goals related to some assigned activity, one may expect to find that decisions about goals will be more easily made in the situation where the group provides a clear-cut norm about goal-setting, than in a situation either of anomie or of conflict in norms.

If, then, a group requires some activity of a member, but he must act in a situation in which it is difficult for him to set a goal in connection with this activity, he should become satiated relatively quickly. If decision-making about goals is made easy for the person, his rate of satiation with the activity should be relatively slow. In the experiment described below we attempt experimentally to manipulate the properties of groups in such a fashion that individual decisions about goals will be made more or less difficult. We then investigate the onset of psychological satiation as it is affected by a person's working in one or another of these types of groups.

### Hypotheses

Hypothesis 1. Given a repetitive activity, degree of satiation will vary inversely with the degree to which the repeated activities are perceived as instrumental to some goal.

Hypothesis 2. Given a repetitive activity, the degree to which each repetition is perceived as instrumental to some goal varies inversely with degree of difficulty in deciding between alternative goals.

From Hypotheses 1 and 2, it follows that:

Hypothesis 3. Given a repetitive activity, degree of satiation varies directly with degree of difficulty in deciding between alternative goals.

Before spelling out the expected effects of group properties upon satiation, it may be helpful to anticipate the experimental procedure, and indicate that we use a group task on which individual members can privately set goals related to "goodness" of performance of the group on successive trials. In Hypotheses 4 and 4a, we compare the effects upon degree of satiation of a person's working in a group in which he is not asked to consider goals for the group (situation A) as against the effects of working in a group in which he is asked to make a private decision about reasonable group goals without knowledge about how others are setting goals (situation B).

Hypothesis 4. Degree of satiation varies inversely with the degree to which the person is required by the group procedure to set goals for the group.

Hypothesis 4a. Degree of satiation in situation A will be greater than degree of satiation in situation B.

Hypotheses 4 and 4a follow from Hypothesis 1, on the assumption that if individuals are not required by the group to set goals for each repetition of the task they will do so less frequently than where they are required to do so. Hence the "degree to which the task is perceived as instrumental to some goal" will be less, and by Hypothesis 1, the degree of satiation will be greater.

In the hypotheses which follow we consider a number of other group situations, in which members are required privately to set goals for the group. The work of Sherif (12), Festinger (3), and others indicates that where individuals are making judgments about relatively ambiguous stimuli they rely upon evidence provided by "social reality", i.e., the norms of their group. We specify below how various group situations will assist or fail to assist members in making judgments about goal-setting. Group situation B, described above, requires members to set goals, but it is assumed they get no information about how others in the group are setting their goals. Situation B gives no basis for learning about group norms, and thus corresponds to Durkheim's "anomie". In situation C, members again set goals, but the situation is defined so that members will find strong disagreement in the group about what are reasonable goals. This situation corresponds to conflict in the group's norms. Whereas the normless situation gives the member no basis in "social reality" to assist in goal-setting, the situation of conflict in norms permits the member to adopt one of the conflicting extremes in goal-setting or to locate a middle ground. Thus, although the evidence provided by "social reality" in situation C is conflicting, it should be easier to make a decision in situation C than in situation B. By Hypothesis 3, degree of satiation varies directly with difficulty of decision. Hence,

Hypothesis 5. Degree of satiation in situation B will be greater than degree of satiation in situation C.

It should be still easier to make a decision where there exists one norm in the group upon which members agree. In situation D, we assume members set goals and that they are informed that others agree with them. It follows, then, that



Hypothesis 6. Degree of satiation in situation C will be greater than degree of satiation in situation D.

We next consider a group situation in which degree of satiation should be at a minimum. If the previously described groups consist of strangers who have been brought together for the first time, members will tend to be less influenced by group norms than if the groups are "cohesive" ones (1). Thus if a single norm exists decisions should be easier to make in cohesive than in non-cohesive groups. If, moreover, reliance of individuals on "social reality" is reduced, by giving members objective information about performance which they can use in setting goals, then decisions should be easier still. In group situation E, it is assumed that members find good agreement in the group on goal-setting, but in contrast to situation D, the group is cohesive and objective information is furnished members which will assist them in setting goals. By Hypothesis 3:

Hypothesis 7. Degree of satiation in situation D will be greater than degree of satiation in situation E.

From Hypotheses 4a, 5, 6, and 7, we obtain the following rank order relationships, where  $Sat_A$  denotes degree of satiation in situation A,  $Sat_B$  denotes rate of satiation in situation B, etc.

Hypothesis 8.  $Sat_A > Sat_B > Sat_C > Sat_D > Sat_E$

Hypothesis 8 is the major proposition tested in this experiment. Expressed in tabular form, we are considering the effects of the following group situations:

Table 1

Differences in Group Situations in Terms of  
Properties Hypothesized to Affect Satiation

Group situation	<u>Group Variable</u>				
	Decisions are made in private about group goals	Group stand- ard is an- nounced	Announced standard is in: conflict agreement	Group standard is co- hesive	Group given object- ive in- formation on per- formance
A					
B	X				
C	X	X	X		
D	X	X		X	
(X)	(X)	(X)		(X)	
E	X	X	X	X	X

Looking across the rows of Table 1, it is apparent that there is a progression going from situations A to E such that each successive group is characterized by an additional property which should make decision-making easier, hence reduce the onset of satiation. Because of time limitations the effect of group situation X was not tested in the main experiment. A comparison of situations D and X should reveal the effects of the "cohesiveness" variable.

Because of its theoretical interest we decided to run the X treatment in a supplementary experiment. Unfortunately, this treatment was administered under somewhat different conditions from those which prevailed for the other treatments. We will therefore present our results in two parts, first indicating the relative effects of treatments A, B, C, D, and E, then considering the effects of treatment X.

## Method

### Subjects

Ss were male undergraduates at the University of Illinois, recruited from 42 fraternities. Recruiting was initiated by the Assistant Dean of Men who wrote letters to all fraternity presidents asking the cooperation of their houses in a study of "group participation." The study was described as requiring from five to ten house members, each person for a two hour period. Those house presidents who agreed to cooperate received letters from the experimenter containing schedule blanks on which they could list the available times of their members. These letters stressed the importance of the study in terms of its possible usefulness for training programs in the armed forces.

After lists of possible subjects and their available times were received, groups consisting of five Ss were formed. For all treatments but the "cohesive" one, the groups were composed of strangers (i.e., Ss from different fraternities); for the "cohesive" treatment each group was formed from men from the same house. The design of the study called for eight groups per treatment, a total of forty groups, or two hundred Ss.

### Apparatus

The physical set-up permitted Ss to work together in repeatedly assembling a single jigsaw figure, while allowing a minimum of communication among the participants. Ss were seated around a circular table approximately 5 ft. in diameter. The jigsaw figure to be assembled was placed within a smaller concentric circle, approximately 3 ft. in diameter. Vertical shields (plywood panels 22 in. high and 18 in. long) extended from this center circle to 6 in. beyond the outer edge of the table.

These shields were placed so as to divide the table into six segments, or "booths", one for each of the five Ss and one for the experimenter. A window shade was mounted at the inner end of each booth, and drawn down to a level which allowed each S a clear view of the jigsaw puzzle placed in the center workspace, but prevented his seeing the occupants of booths opposite his own. A sketch of the apparatus is given in Figure 1.

Assembling the jigsaw figure was entirely a manipulative task. The figure was a simple outline drawing of a locomotive, drawn on white cardboard (13 1/2 in. x 13 1/2 in.) and divided into five sections. (Fig. 2). The outline was to be filled in with pieces of colored poster board cut to fit the five sections of the outline. The pieces were distributed around the outline, and Ss moved them into place using rods, 30 in. long, mounted on swivels in each booth. Attached to each of these rods was a small metal tip which enabled Ss to lift or push the jigsaw pieces into their appropriate places on the outline of the puzzle

### Procedure

Ss in all treatments performed the same manipulative operations, namely working together in using their sticks to fill in the figure of the locomotive. The jigsaw pieces were placed in sequence according to numbers inscribed on the outline. After the figure was filled in the experimenter disassembled it, and the group repeated the task. This procedure continued for each group until it had completed at least forty trials and had worked at least eighty minutes.

The treatments were varied by means of different preliminary instructions (Appendix A) and different experimenter announcements after each trial. Treatments differed in the following respects:

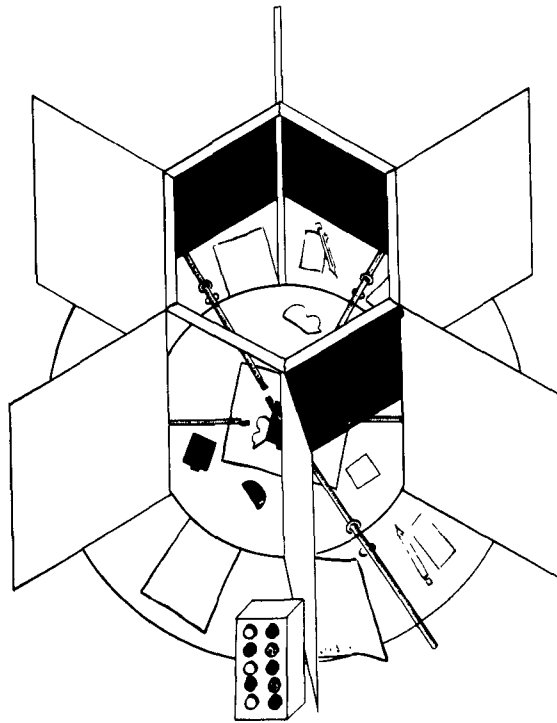


Figure 1. Sketch of the Apparatus

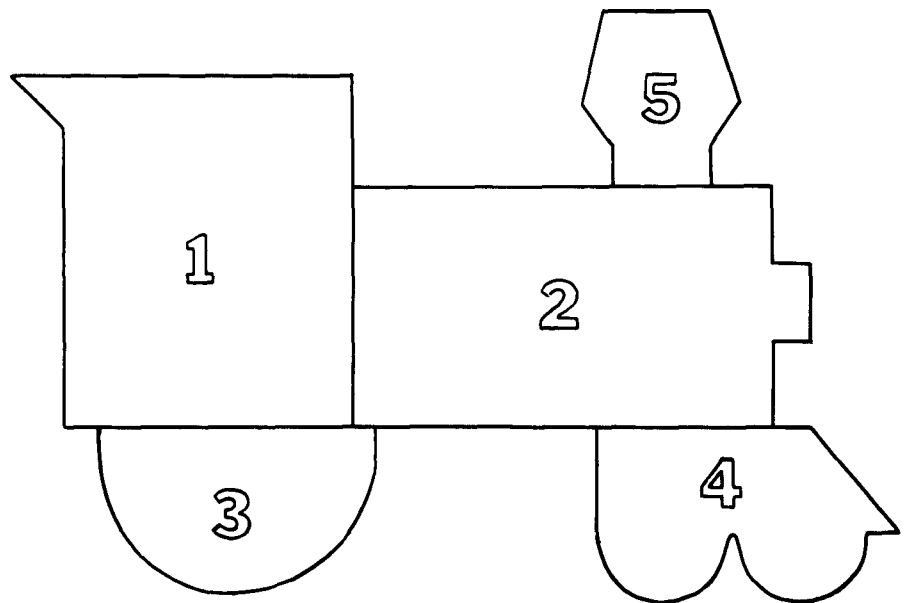


Figure 2. Jigsaw Puzzle Figure Used in the Study

a. Whether or not the Ss attempted to set goals for "goodness" of performance on each trial.

b. If Ss did set goals, whether or not they got information about how much the members in the group agreed with one another on the level of goals set.

c. If they got such information, whether or not the group was reported as in conflict or in agreement.

d. If the group was reported in agreement, whether or not objective information was given about performance time on each trial to assist in setting goals. (In the main experiment, groups which got information about time were also "cohesive", i.e., consisted of Ss from the same fraternity. The effect of "cohesiveness" without objective information was examined in the supplementary experiment described below.)

The methods used to produce each of these differences are described next.

Goal-setting. Groups in all treatments but one (treatment A) were told that there were two purposes for the study, namely to determine how realistically Ss can set goals as they practice the puzzle and to determine how Ss feel about doing the same thing repeatedly. Ss were informed that the goals to be set could range from 0% to 100%, and that 50% was average for college students. They were told that performance was scored on two things, how fast they could assemble the picture and how well they could fit the pieces into the outline. The experimenter said that in order to give Ss a common point of reference, he would report their actual performance score on the first trial, but thereafter Ss would have to make judgments about goals without knowledge of previous performance. It was emphasized in the instructions that under these conditions Ss' judgments would necessarily be quite subjective, but that this was necessary if we were to determine how reasonable or realistic their goal-setting would be.

After the first trial, the experimenter reported to each group that its score was 46%. Ss then filled out the first two items on the message form (Appendix B) which read in part:

1. On the next trial, the goal I expect the group to achieve is \_\_\_\_\_.
2. How sure do you feel that this goal is a reasonable one? (Circle the letter which corresponds to the appropriate statement.)

Very sure		Not too sure		Actually just a guess
a	b	c	d	e

These items were filled out on new message forms before each trial during the course of the experiment.

The instructions for the A treatment said nothing about goal-setting. Ss here were told simply that the experimenter wanted to determine how they felt about doing the same puzzle repeatedly. All comments dealing with goal-setting were omitted from the version of the instructions used for treatment A. (Appendix A). Moreover, although Ss in the A treatment filled out a message form (Appendix B) before each trial, the items concerning expected score were omitted from their forms. While the procedure used in the A treatment did not prevent Ss from setting performance goals, it is to be expected that this would occur less frequently in A than in the other treatments, where goal-setting was required by the procedure. Treatment A may thus be regarded as a "control" treatment which checks the assumption, based on Karsten's (7) work, that degree of satiation on a repetitive task will increase if the task is not seen by S as instrumental to some goal.

Information on group agreement about goal-setting. Ss in all treatments but two (A and B) were given information about whether members of the group were in general agreement or disagreement in the goals each was setting for the group. As noted above, the instructions stated that Ss' judgments about what were realistic goals would tend, under the circumstances of this experiment, to be subjective. The Ss in the groups which underwent treatments C, D, and E were told that to assist them in setting reasonable goals the assistant experimenter would compare the goals the members of the group had written down after each act of goal-setting, and announce how much agreement existed in the group concerning these goals.

The announcements were made according to a six point scale, which ranged from "unusually good agreement" to "unusually strong conflict". Points on the scale were defined for the Ss on 4 in. x 6 in. cards (Appendix C), which were mounted on the wall of each booth during the administration of C, D, and E treatments, only. Announcements made by the assistant experimenter did not correspond with the goals actually set, but were made in a prearranged sequence for all groups within a treatment (Appendix A). After the first trial, all groups in treatment C received announcements on the conflict side of the scale; after the second trial all groups in treatments D and E received announcements on the agreement side of the scale.

From the standpoint of group standards about goal-setting these variations in treatment were designed to produce the effects of anomie (normlessness) in treatments A and B, of conflict in norms in treatment C, and of agreement about norms in treatments D and E.



Information on performance times. Ss were asked to set goals for their performance, taking speed and accuracy of placement into consideration. Ss could estimate accuracy of placement by noting how far the jigsaw pieces deviated from the outline. Estimates of time were, of course, less objective for Ss. In order to reduce difficulty of decision for Ss in the E treatment, the assistant experimenter informed them of their performance time immediately after each trial, in addition to announcing level of agreement about goal-setting. While this information about performance time was designed to make decision-making easier for these Ss, it should be noted that the information given did not completely determine the goal to be set. No other treatment received any information about performance times.

To summarize the procedure: All groups worked repeatedly on the task of assembling a single jigsaw figure. After each trial all Ss, except those in treatment A, privately filled out forms indicating a) the performance goal each was setting for the next trial, b) the difficulty of deciding on these goals, and c) the degree of satiation reached. In treatment A, the form used omitted the scales dealing with goal-setting and difficulty of decision. After the forms were collected, the assistant experimenter announced to the groups in treatments C, D, and E, but not to those in treatment B, how much agreement existed in their goal-setting. Treatment C was given continual announcements of conflict, treatments D and E, continual announcements of agreement. Treatment E was additionally informed about performance times. The task was repeated for a minimum of forty trials or eighty minutes, whichever occurred later. At the end of the series, Ss were asked to fill out a questionnaire (Appendix D) designed to ascertain how they perceived the various features of the experimental treatments, as a check on whether they in fact viewed their particular situations as we intended they should.

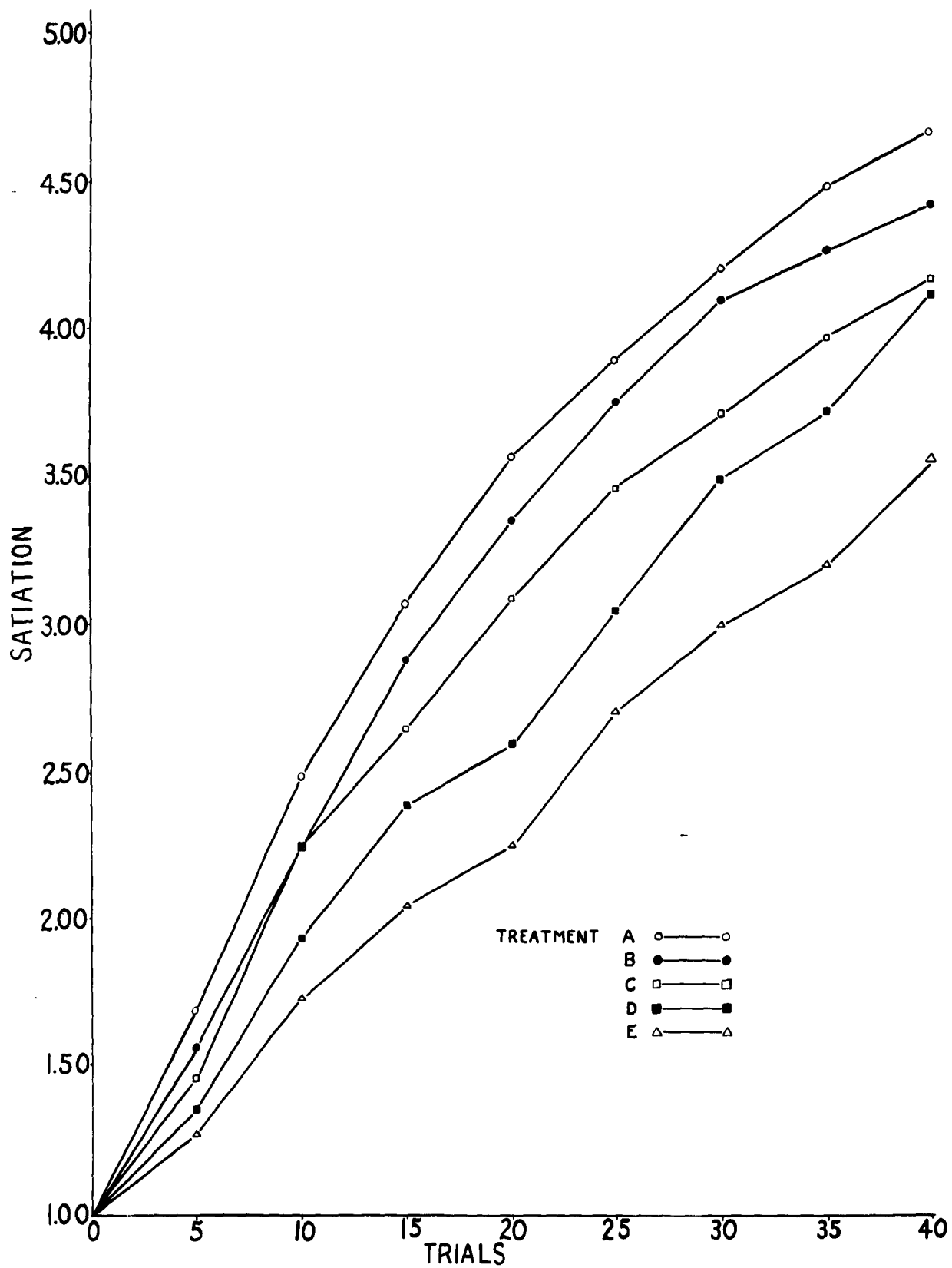


Figure 3. Treatment Mean Satiation Scores  
by Five Trial Intervals

## Results

### A. Satiation

Degree of satiation is operationally defined in terms of the degree of negative valence acquired by the task as it is repeated. Before each trial, Ss indicated the degree of negative valence of the task, using a six-point scale, ranging from (a) "I feel at least some interest in repeating this task" to (f) "I feel that repeating the task is intensely distasteful to me" (Appendix B). The onset of increasing satiation with successive trials is represented graphically for the five treatments in Figure 3.

Figure 3 plots degree of satiation by intervals of five trials over forty trials, the maximum number of trials completed by all groups. Scale points were assigned numerical values from one to six, and satiation scores for each individual were computed as the mean of the scale points checked for each five-trial interval. The degree of satiation reached in a given treatment is the mean of these satiation scores for all individuals within the treatment. That Ss employed the various points of the satiation scale to indicate successively greater negative valence is evident from the steadily rising curves.

Hypothesis 8 asserts:  $Sat_A > Sat_B > Sat_C > Sat_D > Sat_E$ .

To test this hypothesis the mean satiation score per individual,  $\Sigma$  satiation scores, was computed over the full forty trials. The data are number of trials

given in Table 25, Appendix E. The following means of these individual scores were obtained for the five treatments.

Treatment:	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>
Mean					
satiation:	3.54	3.28	3.07	2.85	2.48

The probability of predicting this rank order by chance is less than .01.

The analysis of variance is presented in Table 2, and indicates the difference between treatments is significant at better than the .01 level.<sup>1</sup>

Table 2  
Analysis of Variance for Mean Satiation  
Scores per Person

Source	df	Mean Square	F
Groups	39	2.26	1.45
Treatments	4	6.17	3.96**
Groups within Treatments	35	1.81	1.16
Individuals (Within Groups)	146	1.56	
Total	185		

\*\*  $p < .01$

Although t tests (Table 3) show no significant differences between means of adjacent treatments, when we compare treatments one step removed, that is, A vs C, B vs D, and C vs E the significance of the differences is close to or below the .05 level. Considering that the hypothesis being tested involves an ordered relationship among all five means, we suggest that the fact of significant differences between treatments one step removed

<sup>1</sup>This is a conservative test of hypothesis 8, which involves not merely a prediction of differences among the means, but a statement about their rank order as well. If it is legitimate to combine rank order and analysis of variance probabilities then  $p < .01 \times .01$  or  $p < .0001$ .

Table 3  
Mean Differences Between Satiation Scores for Pairs of  
Treatments

Treatment	B		C		D		E	
	Mean Diff.	p <sup>*</sup>	Mean Diff.	p <sup>*</sup>	Mean Diff.	p <sup>*</sup>	Mean Diff.	p <sup>*</sup>
A	.26	.18	.47	.05	.69	.01	1.06	.001
B			.21	.23	.43	.07	.80	.002
C					.22	.23	.59	.02
D							.37	.10

\*One tail of the t distribution.

indicates the existence of "stability" in the ordering of means which is not taken into account in any single application of the t test. Put another way, we are making the intuitive suggestion that despite the finding of insignificant t's between adjacent means the probability that these differences would reach significance if the number of groups were increased is greater in this case than if equivalent values of t were obtained for two means not thus ordered.

Since our finding that the treatments produced the predicted effects rests on the adequacy of the satiation scale, we describe next our attempts to assess its reliability across treatments and its validity.

As shown by the graph in Figure 3, most Ss moved gradually down the scale from points one to six, indicating that they were treating successive scale points to mean increasing aversion to the task.<sup>2</sup> In the course of interviews during the pretest, however, it became apparent that divergent views were held about how intensely this aversion must be felt before one should check the point "intensely distasteful". With this end

<sup>2</sup>The usual pattern for most Ss was to check each scale point approximately the same number of times or to increase this interval slightly as they moved progressively to their terminal satiation point.

point interpreted differently by different Ss it would be expected that they would disagree too on the interpretation of intermediate points. To check on the meaning of "intensely distasteful" for the various Ss, we included in the post-meeting questionnaire (Appendix D) the following items:

7a. You will remember that you indicated before each trial how you felt about repeating the puzzle. What does the phrase "intensely distasteful", which appeared on the scale dealing with your feelings, mean to you?

Please explain:

7b. Did you have any hesitation in using the statement that "repeating the puzzle is intensely distasteful"?

\_\_\_\_\_ Yes  
\_\_\_\_\_ No

Please explain:

We developed a code for the responses to these items in terms of whether or not the subject expressed resistance against using the final scale point. The code follows:

<u>Code</u>	<u>Characterization of "intensely distasteful"</u>
1 (Indication of resistance to using scale point f)	<p>a. S indicates that use of scale point f would involve defying the experimenter or the instructions, e.g., f means "walking out", "attacking the experimenter", "refusal to cooperate", etc.</p> <p>b. S indicates that use of the term <u>per se</u> is offensive or violates some generalized attitude, e.g., "I don't use extremes", "I don't like to admit defeat."</p> <p>NOTE: If it is possible to interpret S's response to mean that the term "intensely distasteful" is too extreme for the feelings generated <u>in this experiment</u>, then code in Category 2.</p>

<u>Code</u>	<u>Characterization of "intensely distasteful"</u>
2 (No indication of resistance to using scale point f)	a. S does not indicate any of the above, e.g., f means "extremely boring", "the task is disliked", "I would like to stop", etc.

In coding 186 items, two coders showed 98% agreement in their judgments concerning the applicability of categories 1 and 2.

Table 4 presents for the five treatments the distribution of responses coded under Category 1 (Resistant) and Category 2 (Not Resistant), the four cases on which the coders disagreed being included under Category 2.

Table 4  
Distribution Over Treatments and Mean Satiation  
Scores for Individuals Coded in Categories 1 and 2

Treatment	Cat. 1 ("Resistant")		Cat. 2 ("Not Resistant")	
	<u>n</u> *	Mean Satiation**	<u>n</u>	Mean Satiation
A	3	2.54	34	3.62
B	5	2.51	33	3.39
C	2	2.88	35	3.08
D	4	2.18	31	2.93
E	5	2.41	34	2.49
Total	19	<u>G.M.</u> 2.46	Total 167	<u>G.M.</u> 3.11

\* $\chi^2$  (for distribution by categories over treatments) = 1.817, 4 df,  
.80 > p > .70.

\*\* Mean difference (between satiation scores for Categories 1 and 2) =  
.65 ( $t$  = 2.10, 184 df,  $p$  < .02, one tail).

The  $\chi^2$  test of these data is not significant (.80 > p > .70). Although this dichotomized code does not discriminate any meanings associated with scale point f except those indicating high resistance, these results provide some evidence that the scale is reliable across treatments, i.e. that the treatments did not engender systematic differences in the relative number of Ss who attributed extreme meanings to "intensely distasteful".

Table 4 also includes evidence for the validity of this method of coding, presenting the mean satiation scores, by treatment, of Ss classified under Categories 1 and 2. If our method of coding in fact distinguishes between different degrees of resistance to using f, we would expect that those coded under Category 1 would show lower satiation scores than those coded under Category 2. The mean satiation scores are 2.46 for those coded 1, and 3.11 for those coded 2. The hypothesis that our coding reflects real differences in resistance against using scale point f is confirmed at better than the .02 level ( $t = 2.10$ , 184 df, one tail).

Those individuals who expressed no hesitation about using scale point f can be regarded as indicating their feelings of satiation without complications due to resistance against using all points of the scale. They can thus be regarded as giving a "purer" measure of the effects of the various treatments. Eliminating those Ss who are resistant to using f, and comparing the resulting satiation means with the originals, we obtain:

<u>Treatment</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>
Mean Satiation					
Eliminating Ss resistant					
to using f	3.62	3.39	3.08	2.93	2.49
Original (All Ss)	3.54	3.28	3.07	2.85	2.48

We see that when we eliminate those Ss who resisted using the extreme scale point for reasons not directly connected with the actual experimental situation, the effects of the treatments appear to become somewhat more marked.

One of the effects of satiation reported by Karsten is a tendency on the part of Ss psychologically to detach themselves from the repetitive activity, and to engage in out-of-field behavior, fantasies, etc.



In question 4c. of the post-meeting questionnaire we asked:

4c. To what extent did you find yourself doing or thinking about things not directly connected with the puzzles as you continued working on them? (Circle the appropriate point on the scale below.)



Please describe the kind of thing(s) you were thinking about.

To determine whether our satiation scores were valid in the sense that they corresponded with the phenomenon reported by Karsten, we examined the relationship between individual satiation scores and responses to Q.4c., assigning numerical values to the scale points ranging from 9 for "continually" to 1 for "never". Unfortunately the free responses indicated that the question was not entirely clear. Although most Ss who reported themselves frequently "thinking about things not directly connected with the puzzles" stated that they were thinking about home-work, dates, vacations, etc., a number apparently misinterpreted the scale and said they were thinking of ways of improving their performance. Despite this unreliability, the average Pearson  $\bar{r}$  (Table 5) between these self-ratings and out-of-field behavior and individual satiation scores was .38, (175 df,  $p < .01$ ). If now we attempt to purify these data by eliminating from the latter situation the 19 individuals who

Table 5  
Correlations between "Degree of Satiation"  
and Self Ratings on "Out-of-Field" Behavior

Treatment	$\bar{r}$	<u>df</u>	$p$
A	.444	34	<.01
B	.354	35	<.05
C	.242	34	n.s.
D	.565	32	<.01
E	.293	36	n.s.
Average	.378**	171	<.01

\* $\chi^2$  for homogeneity of treatment  $\bar{r}$ 's = 3.236, 4 df,  $.70 > p > .50$

\*\* Corrected for bias in averaging  $\bar{z}$  values

on questions 7a. and 7b., above, expressed resistance to use of the full satiation scale, the average correlation (Table 6) rises very slightly to .40 (152 df,  $p < .01$ ).

Table 6  
Correlations between "Degree of Satiation" and  
Self Ratings on "Out -of-Field" Behavior (Eliminating  
Ss in Category 1)

Treatment	<u>r</u>	<u>df</u>	<u>p</u>
A	.606	31	<.01
B	.281	30	n.s.
C	.243	32	n.s.
D	.591	28	<.01
E	.276	31	n.s.
Average*	.405**	152	<.01

\* $\chi^2$  for homogeneity of treatment r's = 6.338, 4 df,  $.20 > p > .10$

\*\*Corrected for bias in averaging z' values

The last correlation includes only those individuals who did not indicate that their interpretations of the satiation scale differed from meanings intended by the experimenter, i.e., those meanings necessary for a strict test of the hypotheses. This correlation, therefore, can be taken to represent our best estimate of the relationship between degree of satiation and degree of out-of-field behavior.

#### B. Difficulty of decision

The preceding evidence indicates that our treatments influence degree of satiation according to Hypothesis 8, that no discernible difference exists in the Ss' interpretation of the satiation scale across the treatments, and that our satiation scale appears to measure the same phenomenon reported by Karsten. We now turn to an examination of the causes of the differences in degree of satiation among treatments. Treatment A,

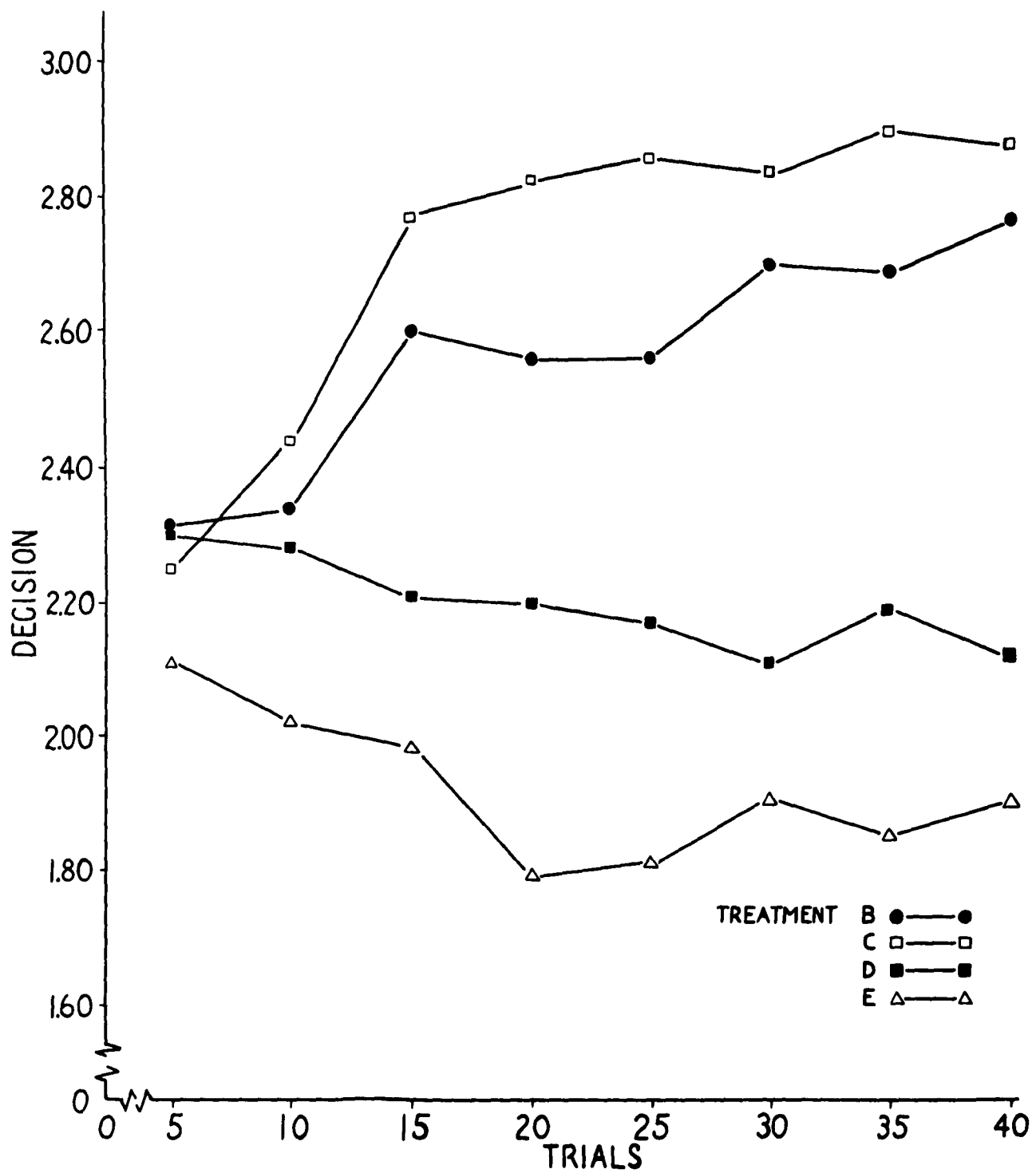


Figure 4. Treatment Mean Decision Scores  
by Five Trial Intervals

we hypothesized, should create the highest level of satiation because Ss were not asked to set performance goals. Degree of satiation in treatments B, C, D, and E would vary in that order, we hypothesized, because Ss would find decision-making about goals in each of these treatments progressively less difficult. The degree of difficulty of decision was indicated by Ss after each trial on a five point scale (Appendix B) ranging from (a) "feel sure" that this goal is a reasonable one to (e) it's "actually just a guess." We assigned numerical values from one to five for decreasing confidence in the reasonableness of the goal set. The mean difficulty of decision for each treatment by five-trial intervals over the forty trials is plotted in Figure 4.

In contrast to the satiation curves, which rise steadily with increasing numbers of trials, these curves indicate that groups move fairly early to a relatively stable position with respect to difficulty of decision. For treatment B, the anomie situation, and treatment C, where conflict in norms was reported, the curves representing decision difficulty show a sharp initial rise and then level off. In the curves for treatments D and E, those in which agreement about norms was reported, some downward trend appears before the curves level off. The continual announcements of agreement in these treatments apparently acted to reassure Ss that the goals they were setting were reasonable, and difficulty of decision was correspondingly lessened.

In the first five-trial interval, the means for all treatments are closely grouped, in the range between 2.11 and 2.31, but at the end of the 36 to 40 trial interval the range has more than quadrupled. It is clear that the treatments act to spread the means for decision difficulty.

The score for difficulty of decision is taken as the mean of scale points checked by each S over the 40 trials (Table 26, Appendix E). The following means were obtained for difficulty of decision expressed by Ss within each of the four treatments:

<u>Treatment</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>
Mean difficulty				
of decision	2.56	2.73	2.18	1.94

The analysis of variance for these means is presented in Table 7, and indicates the difference among treatments is significant

Table 7  
Analysis of Variance for Mean Decision  
Scores per Person

Source	df	Mean Square	<u>F</u> <sup>†</sup>	
Groups	31	.864	1.78*	2.00*
Treatments	3	4.903	10.11**	11.35**
Groups within treatments	28	.432		
Individuals (within groups)	117	.485		
Total	148			

\*  $p < .05$ ,

\*\*  $p < .01$

† The first F value is based on the variance estimate for individuals which, however, is not homogeneous across treatments, Bartlett's test yielding a  $\chi^2$  of 65.967 (31 df,  $p < .001$ ).

The second F value is based on the variance estimate for groups within treatments, which is homogeneous,  $\chi^2 = .544$  (3 df,  $.95 > p > .90$ ).

at better than the .01 level. However it will be noted that the rank order does not conform with expectation, since decision-difficulty for treatment C exceeds that for treatment B. In attempting to evaluate this reversal, we were led to the following consideration. Treatment B received no announcements about agreement or disagreement within the group; treatments D and E received continual announcements of agreement. Ss in treatments B, D and E, therefore, would have no reason to be concerned about failure to be in agreement as would Ss in treatment C, who received continual announcements that the group was in disagreement. While all Ss share the task of deciding upon a reasonable goal for the puzzle, an S in treatment C might set himself an additional problem of decision, namely, deciding upon a goal which would improve

the level of agreement in his group. We noted a common pattern of goal-setting in treatment C which seemed to reflect this concern. Ss tended to oscillate in their goal-setting, shifting goals from one extreme to another in an effort to find a level which would give the group good agreement. As an index of this type of fluctuating behavior we took the mean of the absolute differences between successive goals set by each individual. The mean of Ss' fluctuation scores in treatment C was 4.34; for Ss in all other treatments combined it was 2.41. The mean fluctuation for Ss in treatment C significantly exceeds that for Ss in the other treatments at far better than the .01 level ( $t = 5.78$ , 147 df).

This evidence indicates that we can regard the greater mean difficulty of decision for treatment C as the result of an additional decision problem superimposed on that of selecting reasonable goals for the task. We hypothesized the following:

- a) Difficulty of decision for Ss in treatment C who do not become concerned about reducing the level of disagreement in the group should be less than for Ss who do become concerned about reducing level of disagreement.
- b) The mean difficulty of decision of Ss in treatment C who do not become concerned with reducing level of disagreement should fall in the rank order predicted for the treatment. Denoting this group of Ss as  $C'$ , and degree of difficulty of decision for treatment B as  $Dec_B$ , etc., this hypothesis is equivalent to the statement:  $Dec_B > Dec_{C'} > Dec_D > Dec_E$ .
- c) Degree of satiation on the test task is a function of difficulty of decision in goal-setting for that task, and is not affected by increments in difficulty of decision due to overlapping considerations. This hypothesis asserts that there will be no difference in degree of satiation between Ss in  $C'$  and the remaining group of Ss in the C treatment, denoted  $C''$ .

To distinguish the  $C'$  and  $C''$  groups, we referred to the post-experimental questionnaire (Appendix D) on which the subjects had been asked to indicate on six-point scales their responses to the following:

4a. There are many different things that people might focus on in working on these puzzles. To what extent was your own interest focused on increasing the amount of agreement which was announced for your group?

4b. To what extent was your own interest focused on improving the efficiency of performance as you worked in these puzzles?

Fifteen Ss in treatment C indicated that they more frequently focused on the task than on agreement; the remaining 22 Ss were taken as being relatively more focused on agreement. For the group focused on the task the mean difficulty of decision score was 2.50; for the group focused on agreement the mean was 2.90 ( $t = 1.56, 35 \text{ df}, p < .06, \text{one-tail}$ ). This result accords with hypothesis a), above, and we interpret the score of 2.50 to represent the difficulty of decision induced by the C treatment in the "pure" case where there is no increment due to concern over agreement. The mean score for these "pure" cases in C' falls in the correct rank order relative to B, D, and E, confirming hypothesis b). We predicted in hypothesis c) that overlapping decision considerations which were irrelevant to goal-setting for the test task should make no difference in satiation on that task. Comparing the degree of satiation reached by Ss in the two groups, we find mean satiation for the 15 Ss focused on the task to be 3.07; for the remaining 22 Ss who are additionally concerned with agreement the mean is exactly the same, 3.07.

It is apparent, therefore, that the unexpectedly high decision score in treatment C reflects an adventitious factor which does not affect degree of satiation, and if the effects of this factor are removed treatments B, C, D and E have the experimentally intended effects upon difficulty of decision in setting goals for the task. In addition we note in Table 8 that the average Pearson product-moment correlation between mean satiation scores and mean decision scores, pooling all individuals within each of the four treatments, respectively,

Table 8  
Correlations between "Degree of Satiation"  
and "Difficulty of Decision"

Treatment	<u>r</u>	<u>df</u>	<u>p</u>
B	.219	35	n.s.
C	.241	34	n.s.
D	.168	32	n.s.
E	.283	36	n.s.
Average*	.227**	137	< .01

\* $\chi^2$  for homogeneity of treatment r's = 1.197, 3 df, .80 > p > .70

\*\* Corrected for bias in averaging z' values

is  $\bar{r} = .23$  (137 df, p < .01). Removing those Ss in treatment C whose decision scores were inflated by their attempting to reduce disagreement in the group (Table 9)  $\bar{r}$  rises very slightly to .25 (115 df, p < .01).

Table 9  
Correlations between "Degree of Satiation"  
and "Difficulty of Decision" (Eliminating Ss  
in C')

Treatment	<u>r</u>	<u>df</u>	<u>p</u>
B	.219	35	n.s.
C'	.483	12	n.s.
D	.168	32	n.s.
E	.283	36	n.s.
Average*	.252**	115	< .01

\* $\chi^2$  for homogeneity of treatment r's = 1.197, 3 df, .80 > p > .70

\*\* Corrected for bias in averaging z' values



These significant, though low positive, correlations substantiate the general hypothesis that satiation on a task is directly related to the difficulty of making a decision about the task.

It is to be noted, however, that working under conditions which produced different degrees of decision-difficulty was not the exclusive variation experienced by Ss as a result of the treatments. The question naturally arises as to whether the obtained differences in satiation can be attributed to other features of the experimental situation.

It might be asked, first, whether differences in satiation resulted only from some initial set produced by the instructions or whether differences must be explained in terms of the experience of working under the various group procedures (including the possibility of interaction of set and experience). If the effects are produced by a set induced by the instructions, we should expect differences in satiation to appear very early, say, in the first five or ten minutes. In view of the lack of homogeneity of variances based on individual means, analyses of variance were performed on group means for the intervals 0-5 minutes and 6-10 minutes, respectively. Averaging these group means by treatments, we obtain:

<u>Treatment</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>
Mean Satiation 0 to 5 minutes	1.28	1.30	1.20	1.14	1.16
Mean Satiation 6 to 10 minutes	2.49	2.25	2.25	1.94	1.74

For the first five minutes the order of the means is somewhat scrambled; from six to 10 minutes, the predicted order is beginning to emerge. However, Tables 10 and 11 show no significant differences in either case.

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Table 10  
Analysis of Variance for Mean Satiation  
Scores per Group, 0 to 5 Minutes of Work

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<u>Source</u>	<u>df</u>	<u>Mean Square</u>	<u>F</u>
Treatments	4	.038	1.06 <sup>†</sup>
Within Groups	35	.036	
Total	39		

---

<sup>†</sup>For significance at the .05 level, with 4 and 35 df, an F of 2.64 is required.

---

Table 11  
Analysis of Variance for Mean Satiation Scores  
per Group, 6 to 10 Minutes of Work

Source	<u>df</u>	Mean Square	<u>F</u>
Treatments	4	.678	1.93 <sup>†</sup>
Within Groups	35	.351	
Total	39		

<sup>†</sup>For significance at the .05 level with 4 and 35 df, an F of 2.64 is required.

We must conclude that differences in degree of satiation are due to the effects of different experiences during work on the puzzles, rather than immediate effects of sets which were produced by the instructions alone.

We have compared satiation scores holding number of trials constant. An uncontrolled variation in the experiment was the time spent by Ss in completing the forty trials. Since satiation can be presumed to be affected by length of time at work, we might inquire whether differences in time spent in the experiment contributed significantly to the obtained differences in satiation. To determine this, we performed an analysis of covariance, adjusting satiation scores for total time spent in completing forty trials. The variance table (Table 12) is based on group, rather than individual, means, and indicates that over forty trials, even with this less sensitive method, differences in degree of satiation among treatments appear at better than the .05 level. An analysis of

Table 12  
Analysis of Variance for Mean Satiation Scores Per Group  
Over 40 Trials

Source	<u>df</u>	Mean Square	<u>F</u>
Treatments	4	2124.06	3.45*
Within Groups	35	615.58	
Total	39		

\*  $p < .05$

variance based on the time required by each group within the five treatments to reach forty trials shows the differences among treatment means to be non-significant (Table 13).

Table 13  
Analysis of Variance for Time  
Required by Groups to Complete 40 Trials

Source	<u>df</u>	Mean Square	<u>F</u>
Treatments	4	80.40	1.51 <sup>†</sup>
Within Groups	35	53.16	
Total	39		

<sup>†</sup>For significance at the .05 level, with 4 and 35 df, an F of 2.64 is required.

Adjusting the satiation means for forty trials by the time required by each group to reach the forty trials we obtain:

<u>Treatment</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>
Adjusted Mean Satiation:	3.41	3.36	3.08	2.82	2.59

This operation does not change the predicted order of the means, and as shown by Table 14 the analysis of covariance is reduced only slightly in overall significance, being significant at approximately the .07 level.

Table 14  
Analysis of Covariance Adjusting Group Satiation Scores  
for Time Required to Complete 40 Trials

Source	<u>df</u>	Mean Square	<u>F</u>
Adjusted Means	4	1473.57	2.54 <sup>†</sup>
Within Groups	34	581.13	
Total	38		

<sup>†</sup> $p = .07$  (approx.)

It follows that we cannot explain the obtained differences in satiation by uncontrolled experimental variations in the amount of time spent at work in the different treatments.

### C. Effects of "loss of contact" in goal-setting

It will be recalled that the rationale for the hypothesized relationship between difficulty of decision and degree of satiation involved the assumption that increased difficulty of decision would reduce the "degree to which an activity is viewed as instrumental to some goal" (Hypothesis 2). Repeated trials on "goal-less" activities should then produce more rapid satiation. The conceptual distinction proposed by Lewin (8) between activities which are or are not connected with a goal is clear enough. And using this all-or-none definition, one can specify for a series of activities the "degree to which they are instrumental to some goal" by taking the proportion of activities which the person does connect with a goal to the total number of activities in which he has been engaged.<sup>3</sup>

We were unable, in advance of the experiment, to devise measures of the degree of connectedness of activities with goals. In this section we report the results of an attempt to improvise such a measure based on our subsequent greater familiarity with the possibilities existing in the data.

In all but one of our treatments, Ss were required before each trial to write down a number which presumably represented the goal they expected the group to attain. These numbers might be entered on the message forms even though Ss were not striving to achieve

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<sup>3</sup>Intuitively one might think of activities as being more or less connected with a given goal, as distinct from this "either-or" conception. Thus, for example, we speak in everyday life of a person's "really trying" to reach a given goal, "being half-hearted", or "not trying at all." Such notions can probably be handled conceptually in terms of Lewin's treatment of varying degrees of "potency" of the goal. In this case it would be possible to speak of "the degree to which a single activity is instrumental to some goal." The all-or-none formulation used above would then represent the limiting conditions of "degree of being instrumental." If the activity is "not connected" with a goal, the potency of any particular goal equals zero; if the activity is "connected" with a goal the potency of the goal equals one.

the goal, i.e., even though the activity were not really connected with the indicated "goal." If this sort of "ritualistic" goal-setting were occurring, we should expect Ss to write down goals which would bear little relation to actual performance. Such lack of "realism", or "loss of contact" between goal-setting and performance, would be evidenced, for example, by raising one's goal after a trial on which the group's performance had worsened markedly, or by lowering one's goal after a trial on which performance had improved markedly.

Since treatments B, C and D had no time announcements, we were faced with the problem of deciding how much of a time increment would be required for Ss to perceive that performance on a trial had worsened, and how much of a time decrement would be perceived as improvement. Mean time per trial for all groups in all treatments was 1.15 minutes. We decided, arbitrarily, that if a trial took either .20 minutes (12 seconds) more or less than the preceding one, the difference would be considered discriminable by Ss.

Considering only those trials which involved changes of .20 or more minutes in performance time, degree of "loss of contact" for an individual is measured by the percentage of these trials on which he set his next goal in the wrong direction. The basic data are given in Table 27, Appendix E. For the four treatments involving goal-setting the means are:

<u>Treatment</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>
Mean "loss of contact" score:	19.51	20.56	13.24	11.05

In accordance with Hypothesis 2, the rank order of "loss of contact" scores coincides perfectly with that obtained with the "difficulty of decision" measures, the probability of obtaining this by chance being  $p \approx .03$ . Again, we suggest that the "loss of contact" score for Ss in treatment C is inflated by virtue of their trying to get into agreement with their group. For though they may be in relatively good contact with performance on any given trial, they may choose to ignore performance, and deliberately shift their goals in the "wrong" direction in the attempt to improve group agreement. This suggestion is supported by comparing

"loss of contact" for the 15 Ss in C' (the subgroup focused on the task) with the 22 Ss in C'' (the subgroup focused on agreement). Parallelizing the findings for "difficulty of decision", the mean "loss of contact" for C' is 17.41, falling between treatments B and D; the mean "loss of contact" for C'' is 22.71, exceeding treatment B. (Although in the expected direction, the difference between the two means is not significant ( $t = 1.15$ , 35  $df$ ,  $.15 > p > .10$ , one-tail).

The effects of treatments upon "loss of contact" could not legitimately be evaluated by an analysis of variance, since by Bartlett's test the variances were not homogeneous, whether computed for individuals within groups ( $X^2 = 54.90$ , 31  $df$ ,  $p < .01$ ) or for groups within treatments ( $X^2 = 15.37$ , 3  $df$ ,  $p < .01$ ), and we could find no transformation which would render them homogeneous. Friedman's (4) non-parametric analysis of variance by ranks was used instead. Groups were arranged within treatments in the order in which the experiment was administered to them and were ranked across treatments on the basis of their mean "loss of contact" scores. The following rank sums were obtained:

<u>Treatment</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>
Rank sum for "loss of contact":	25	26	16	13

The difference among rank sums by treatment is significant at better than the .05 level ( $X^2_r = 9.45$ , 3  $df$ ).

Although the results reported above are consistent with Hypothesis 2, we failed to find corroboration for the hypothesis in correlating "difficulty of decision" and "loss of contact" scores within each of the five treatments. Table 15 presents these separate product moment correlations for the various treatments, as well as their average. In no case did any of these correlations approach significance. While this result may be due to unreliability of the decision scale or to peculiarities in the distribution of the proportions measuring "loss of

contact", it indicates the need for further testing of Hypothesis 2.<sup>4</sup>

Table 15  
Correlations between "Difficulty of Decision"  
and "Loss of Contact" in Goal-Setting

Treatment	<u>r</u>	<u>df</u>	<u>p</u>
B	-.020	35	n.s.
C	-.008	34	n.s.
D	-.215	32	n.s.
E	-.066	36	n.s.
Average*	-.074**	137	n.s.

\*  $\chi^2$  for homogeneity of treatment r's = .916, 3 df, .80 > p > .70

\*\* Corrected for bias in averaging z' values

#### D. Effects of Ss' evaluations of performance

Having found evidence, reported in the previous section, that treatments produced differences in the degree to which Ss were "in contact" with previous performance while setting goals, we next inquired whether this fact would have consequences for "goodness" of performance. The present experiment resembles level of aspiration experiments (9) in that individuals went through a continuing cycle of goal-setting and performance, although, except for the E treatment, they received no objective "feedback" on the factors (speed and accuracy of placement)

<sup>4</sup> An alternative interpretation of the finding that "loss of contact" varies significantly with treatments is that this is caused by satiation level, which varies similarly with treatments. However, the average product moment correlation based on "satiation" and "loss of contact" coefficients for each of the four treatments is likewise non-significant ( $\bar{r} = .01$ , 137 df).

which presumably determined their success or failure. The level of aspiration experiment by Sears (10) suggests that improvement in performance over successive trials is a function of how realistically Ss set goals. A possible reason is that, if one is trying to improve performance, goal-setting is necessary as part of the "feedback" process whereby each trial supplies information about whether a given goal can or cannot be reached, so that the person can then judge what specific corrections in his performance will be necessary in order to improve. Such use of goal-setting in relation to making and testing hypotheses about improvement will in the long run tend to keep goals fairly close to actual achievement, tend to keep positive increments in goal-setting rising slowly, and tend to improve performance as suggested by Sears' (10) finding with academically successful pupils. If, on the other hand, goals are "out of contact" with performance, this "steering effect" of goal-setting will be absent and improvement with practice should be slower..

Ss in the B, C, D and E treatments started from the same reported level of performance, being informed that their initial performance ranked at the 46th percentile. In all treatments Ss tended to set higher goals over successive trials. We assume that a measure of an S's own evaluation of his group's improvement is given by the mean of the goals he sets over the forty trials. One test of the hypothesis that improvement is inversely related to degree of "loss of contact", then, is a comparison of the mean level of goal-setting for the four treatments in which Ss set goals. The basic data are given in Table 28, Appendix E. The means of these individual scores within the various treatments are:

<u>Treatment</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>
Mean goal score	62.68	66.94	72.87	79.06

In line with the hypothesis, we find a perfect negative rank order correlation between treatments ordered by "loss of contact" and by goal scores. Table 16, moreover, shows the



difference among goal scores across treatments are significant at the .01 level.

Table 16  
Analysis of Variance for Mean Goal  
Scores per Person

Source	<u>df</u>	Mean Square	<u>F</u>
Groups	31	337.43	2.69**
Treatments	3	2027.84	16.15**
Groups within Treatments	28	156.31	
Individuals (Within Groups)	117	125.57 <sup>†</sup>	
Total	148		

\*\*  $p < .01$

<sup>†</sup>On Bartlett's test of homogeneity  $\chi^2 = 36.619$ , 31 df,  $.30 > p > .20$

The results of correlating "loss of contact" and goal scores are presented in Table 17. Although the significantly negative average

Table 17  
Correlations between "Loss of Contact" and  
Goal Score

Treatment	<u>r</u>	<u>df</u>	<u>p</u>
B	.003	35	n.s.
C	-.484	34	< .01
D	-.453	32	< .01
E	.176	36	n.s.
Average*	-.195**	137	< .05

\*Treatment r's are not homogeneous,  $\chi^2 = 12.912$ , 3 df,  $p < .01$

\*\*Corrected for bias in averaging z' values

correlation ( $\bar{r} = -.195$ , 137  $df$ ,  $p < .01$ ) which is obtained confirms the hypothesis, it should be pointed out that the procedure involved is suspect on two grounds: a) the variances of "loss of contact" scores based on groups within treatments are not homogeneous, as we noted in the preceding section; b) the treatment  $r$ 's cannot be assumed to come from a common population of correlation coefficients as indicated by the significant  $X^2$  in Table 17. However, significant negative correlations which are free from these objections, do appear for treatments C and D, and these results appear to substantiate the hypothesis, though they raise the question concerning the reason for differential effects among treatments.

It is obvious that alternative hypotheses are possible to account for the finding that goal scores reach progressively higher levels as we go from treatments B to E. This order is not only inversely related to "loss of contact" means, but to satiation means and difficulty of decision means, as well. It might be suggested, for example, that treatments which produce higher satiation will also produce worse performance and therefore lower goal scores. Indeed, another possibility is that goal scores bear a causal relation to satiation, since conceivably the task will become more satiating the less one improves in performance.

The possibility of a relationship between satiation and goal scores is examined in Table 18, and the  $\bar{r}$ , averaged for treatments, is found

Table 18  
Correlations between "Degree of Satiation"  
and Goal Scores

Treatment	$\bar{r}$	$df$	$p$
B	-.290	35	n.s.
C	-.073	34	n.s.
D	..068	32	n.s.
E	-.060	36	n.s.
Average*	-.094	137	n.s.

\* $X^2$  for homogeneity of treatment  $r$ 's = 2.367, 3  $df$ ,  $.50 > p > .30$

to be not significant. The possibility of a relationship between difficulty of decision and goal scores is examined in Table 19.

Table 19  
Correlations between "Difficulty of  
Decision" and Goal Scores

Treatment	<u>r</u>	<u>df</u>	<u>p</u>
B	-.331	35	< .05
C	.010	34	n.s.
D	-.039	32	n.s.
E	.114	36	n.s.
Average*	-.064	137	n.s.

\* $\chi^2$  for homogeneity of treatment r's = 4.104, 3 df, .30 > p > .20

The average r is again not significant, although a correlation coefficient significant at better than the .05 level appears for the B treatment.

The major finding of this section is that the various treatments had differential, and apparently systematically ordered effects, upon the Ss' level of goal-setting. We were led into this line of inquiry as a consequence of the hypothesis that "loss of contact" should reduce goodness of performance. Attempts to put this hypothesis to further test by examining correlations between "loss of contact" and goal scores within treatments, yielded two significant coefficients out of four. We conclude that the hypothesis remains plausible, though scarcely well-substantiated.

In the next section we consider whether the effects of treatment upon actual group performance are similar to the above-reported effects upon level of goal-setting.

### E. Effects on performance

The experimental instructions stated that performance on the puzzles would be scored on the basis of time and accuracy of placement. Qualitative observations during the experiment led us to believe, however, that groups in different treatments attached differential importance to time and to placement, despite these instructions. Tables 30 and 31, Appendix E, give the basic data. Comparing mean time per trial for the groups in the various treatments we find:

<u>Treatment</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>
Mean time score (minutes per trial):	1.36	1.17	1.11	1.16	.92

Table 20 shows that the differences for time scores are significant at better than the .01 level. Groups in the E treatment

Table 20  
Analysis of Variance for Mean Time  
per Trial (Group Means)

<u>Source</u>	<u>df</u>	<u>Mean Square</u>	<u>F</u>
Treatments	4	.205	6.03**
Within Groups	35	.034	
Total	39		

\*\*  
 $p < .01$

appear to be fastest, little difference appears among treatments B, C and D, and treatment A appears slowest. However, one cannot conclude from these data that groups in E treatment, for example, were superior to the others. E groups, unlike the others, received continual announcements of performance times, and being thus constantly reminded of speed, would be

expected to stress time at the expense of accuracy. This is corroborated by comparing "inaccuracy" of placement<sup>5</sup> among treatments.

<u>Treatment</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>
Mean placement ("in-accuracy") score:	3.57	3.66	3.75	3.45	5.10

As shown in Table 21, differences in "inaccuracy" are significant

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Table 21  
Analysis of Variance for Mean Placement  
per Trial (Group Means)

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<u>Source</u>	<u>df</u>	<u>Mean Square</u>	<u>F</u>
Treatments	4	3.68	3.29*
Within Groups	35	1.12	
Total	39		

\*  $p < .05$

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at better than the .05 level. While the E groups are most inaccurate, the D groups are least so. Our impression in watching the groups at work was that in view of the awkwardness of making hairline adjustments using sticks, D groups were working quite close to the limit of accuracy. It is possible that this focus upon accuracy resulted from some such process as the following: because individuals in D groups received continual announcements of agreement, they tended to become "conservative"

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<sup>5</sup>The outline of the puzzle was drawn on a grid. "Inaccuracy" of placement was measured by summing the number of grid units by which each piece of the puzzle deviated from the outline at its maximum point of deviation.

about shifting goals in order to maintain themselves in agreement, and would shift goals only when they could be fairly certain that others would shift them, too. In D groups changes in degree of accuracy on a puzzle were public knowledge, whereas changes in time had to be judged subjectively. As a result, therefore, of their interest in maintaining their high announced level of agreement, we suggest that D groups were more sensitive than others to questions of accuracy, and tended to focus their efforts upon improving placement.

In order to measure actual goodness of performance one might consider adjusting time scores in terms of placement scores by analysis of covariance. This would be legitimate provided treatments are homogeneous with regard to correlations between time and placement. The following are the Pearson product moment correlations, each based on the eight pairs of scores available for a single treatment.

<u>Treatment</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>
Correlations between mean time and mean "inaccuracy" ( <u>df</u> = 5)	-.611	-.135	-.134	.049	-.135

In view of the small sample of scores, it is not surprising that in only one case, treatment A, did we find a correlation which approaches significance ( $\underline{r} = -.61$ , 5 df,  $.10 > \underline{p} > .05$ ). It is to be expected that with greater inaccuracy time per trial should decrease, but this statement should be qualified for groups in the D treatment. We observed during the experiment that when Ss tried to make fine adjustments -- as was typical of the D groups -- they frequently brushed against pieces already in position, pushing them out of place. When this occurred, different individuals would attempt to adjust different of the disarranged pieces, coordination appeared to break down, and accurate placement became more difficult, markedly increasing the time required to finish the puzzle. Some groups, indeed, were observed to "give up

in disgust" before they had attained the level of accuracy which existed before disarrangement of the pieces, thus increasing both "inaccuracy" scores and time scores. This discussion should indicate why, despite the fact that the above-reported correlations are homogeneous ( $\chi^2 = 1.673$ , 4 df), we question whether the assumption of linearity of regression, required for covariance analysis, is fulfilled in fact. Nevertheless, it is interesting to note the results obtained when adjusting time scores in terms of inaccuracy scores:

<u>Treatment</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>
Time scores, adjusted for placement:	1.30	1.12	1.06	1.11	.93

All time scores, except for treatment E, receive slight downward adjustment. The analysis of covariance on which these adjustments are based is given in Table 22, which indicates the differences are significant at better than the .01 level. The rank order of these scores

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Table 22  
Analysis of Covariance Adjusting Time Score  
per Trial for Placement Score

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<u>Source</u>	<u>df</u>	<u>Mean Square</u>	<u>F</u>
Adjusted Means	4	.132	4.70**
Within Groups	34	.033	
Total	38		

\*\*  
p < .01

---

conforms with what we would expect in terms of the hypothesis concerning the effects of "loss of contact" upon performance, with the exception of treatment D, whose adjusted time score is greater than that of treatment C. We have pointed out above, however, that D groups tended to work close

to the limit of accuracy, and that in this situation the correlation between time and placement may differ from the correlation which we would expect to obtain for groups not stressing accuracy so highly. If we were able to take into account the presumed non-linearity of regression of time on placement, and make due allowance for the suggested marked increase in time associated with very high standards of placement, the time score for the D treatment would receive a greater downward adjustment than would the time scores for the other treatments. Such an adjustment would quite possibly bring the D treatment mean between the C and E treatment means, in the order predicted by the hypothesis.

#### F. The effect of "cohesiveness"

In this first experiment we followed the strategy of trying to maximize the hypothesized effects, and designed treatment E, as noted above, in terms of conditions which would be theoretically optimal for retarding satiation. While each treatment differed from the preceding one in a single respect, treatment E differed from treatment D on two variables: a) Ss in the E groups received objective information about performance, b) E groups were cohesive. After confirming the predicted rank order of satiation means for treatments A through E, we decided to look into the question concerning the relative effects of the variables, objective information and cohesiveness, respectively. We therefore designed a sixth treatment, designated X, which would be intermediate between D and E in the original design. Treatment X resembled D in all respects except that X groups were cohesive and D were not. If level of satiation for treatment X fell between the D and E levels, one could conclude that the variable "cohesiveness" was having some effect. If there were no difference between treatments D and X, then one would have to conclude that the low level of satiation in treatment E was due to the objective information in interaction with cohesiveness, but that cohesiveness alone was without effect. The basic data for treatment X are given in Table 29; Appendix E.



The X treatment is presented separately from the others for two reasons. First, it was administered considerably later in the semester than the other treatments, recruiting taking place two weeks before final examinations. During the recruiting Ss complained about having to sacrifice valuable studying time, and they seemed to participate mainly because of pressure from fraternity officers. Although we have no direct evidence on this point, it is possible that the initial attitude of these "coerced" Ss would, in the X treatment, influence the rate with which satiation set in.

A second factor which led us, in advance of the analysis, to question the comparability of the X treatment with the others was the strong tendency of Ss in these groups to communicate with each other. The experimental instructions, which forbade communication, were effective in other treatments, but they were apparently not strong enough to combat tendencies to communicate among the close friends in the X treatment groups. Although the E treatment groups were cohesive, too, it should be noted that they did not attempt to converse with each other to the same degree. A possible reason for this is that members of E treatment groups received objective information<sup>6</sup> and had, therefore, less need to communicate with other members of their group. In the X treatment, however, in the absence of objective information the force to communicate would be the same as in treatment D, and the restraints against communication would be less, since the groups were composed of friends -- which would appear to account for the difficulty we had in maintaining silence in the X treatment.<sup>7</sup>

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<sup>6</sup>The use of "social reality" or group standards for supporting an individual's judgments in the absence of objective standards is discussed in Festinger (3).

<sup>7</sup>A rather simple expedient which would handle this problem, in repeating the experiment, would be to extend the partitions separating Ss an additional foot, thereby making it impossible for an S to lean back in his chair in order to see and address his neighbor.

While we have no quantitative measures of amount of communication within the various groups, we can easily test an hypothesized effect of such communication. If communication exists one would expect Ss to be influenced by others' feelings as they indicate their satiation scores. This should result in greater homogeneity of individual satiation scores in the X groups as compared with groups in the other treatments. Table 23 presents a one-way analysis of variance

Table 23  
Analysis of Variance for Mean Satiation  
Scores per Person Within the X Treatment

Source	<u>df</u>	Mean Square	<u>F</u>
Between Groups	7	5.28	5.74***
Individuals (Within Groups)	31	.92	
Total	38		

\*\*\*  $p < .001$

of data from the X treatment, and indicates that the within groups variance is .92, 31 df. We have seen in Table 2, above, that the within groups variances of groups in treatments A through E are homogeneous ( $X^2 = 37.61$ , 39 df,  $.50 > p > .40$ ), and can be regarded as having been drawn from a common population. By Table 2 the pooled within groups variance for treatments A through E is 1.56, 146 df. Comparing the estimated within-group variances for treatment X and treatments A-E, respectively, we obtain  $F = 1.70$  (146 and 31 df,  $p < .05$ ). The finding that satiation scores of individuals within given groups are significantly less variable in treatment X than in all the other treatments indicates that members of groups in the X treatment were quite likely influencing each other with respect to feelings of satiation.

Given the observed communication, and resultant high intermember influence in X groups, did this tend to raise the level of satiation or reduce it? During the experiment we observed what seemed to be unusually marked differences among the various X groups, some maintaining high levels of interest in the task throughout the experiment, others apparently becoming quickly satiated. We turn, therefore, to a comparison of the variability of mean satiation scores between the groups in the X and the A through E treatments respectively. Table 23 indicates that the between groups variance in the X treatment is 5.28, 7 df. If we test the homogeneity of between-group variances for treatments A through E, respectively, we find by Bartlett's test that  $\chi^2 = 1.858$ , 4 df,  $80 > p > .70$ , so that these variances can be regarded as samples from common population. As shown by Table 2, above, the "pooled" variance based on groups within treatments is 1.81, 35 df. Comparing the estimated between-group variances for treatment X and treatments A through E, respectively, we find  $F = 2.92$  (7 and 35 df,  $p < .05$ ). We conclude that in comparison with A through E groups, the operation of intermember influence in the X groups sometimes served to raise the overall level of satiation and sometimes served to diminish this. Table 23 reveals, in fact, that X groups differed among themselves in mean levels of satiation at a very high level of confidence ( $p < .001$ ). This was not true for groups in the A through E treatments, where by comparing the variance of groups within treatments to the within groups variance, we obtain  $F = 1.16$  (35 and 146 df, n.s.).

These findings are of interest in that they provide quantitative evidence for the proposition that communication within a group can serve to accelerate or decelerate the onset of satiation in members. However, from the point of view of our design, the significant between-groups variance in the X treatment implies that we cannot legitimately average group means for comparison with the D and E treatments.

Nevertheless, as a matter of possible interest to the reader, we present this comparison in Table 24, which includes besides the means for satiation, the means for the major variables used in this study.

Table 24  
Comparison of the D, E and X Treatment  
Means for the Major Dependent Variables

Score	Treatment Means		
	D	X	E
Satiation	2.85	2.90	2.48
Difficulty of Decision	2.18	1.91	1.94
Loss of Contact	13.24	13.07	11.05
Level of Goal-Setting	72.78	73.97	79.06
Time per Trial	1.16	1.13	.92
Placement per Trial	3.45	3.96	5.10
Performance (Time adjusted for placement)	1.15	1.13	.96

In most respects, except perhaps for "difficulty of decision", there is a quite close correspondence between the various scores in the D and X treatments. But it should be noted again that we cannot on the basis of these data assert that "cohesiveness" (without communication) does or does not affect satiation. What we can assert, on the basis of the preceding findings, is that cohesiveness tends, in the absence of objective information about performance, to increase the level of communication within a group, and that this will make for uniformity of satiation level among members, whether the satiation level is lowered or raised.

### Summary

The experiment reported in this study was designed to test hypotheses concerning rate of psychological oversatiation among group members working on a repetitive group task as a function of characteristics of their groups. The group characteristics considered were those presumed to affect the difficulty of decision in setting goals for the tasks. We hypothesized in the main experiment that satiation will set in more rapidly as we go from first to last of the following treatments: Treatment E) Ss work in cohesive groups, receive information about actual performance times, are told strong agreement exists in the way the group sets goals; Treatment D) Ss work with strangers, receive no information about performance, are told there is strong agreement in goal-setting; Treatment C) Ss work with strangers, receive no information about performance, are told there is strong disagreement in goal-setting; Treatment B) Ss work with strangers, receive no information about performance, receive no information about others' goal-setting; Treatment A) Ss work with strangers, do not set goals (checking the assumption that activities not performed in relation to goals are most satiating).

Results were reported which show that treatments A through E significantly affect degree of satiation (as well as difficulty of decision) in the order predicted, indicating these group characteristics systematically influence the onset of psychological satiation.

Additional data were reported which demonstrate that the treatment variations affect group productivity as well. These data are not inconsistent with a proposed interpretation that difficulty of decision leads to "loss of contact" between goal-setting and actual performance, and thereby to slower improvement in performance. Significant differences among treatments were found, both with level of goals set by Ss and with measures of time and accuracy of performance.

A supplementary experiment was reported which was intended to fill in the condition absent in the five-treatment design: treatment X) Ss work in cohesive groups, receive no information about actual performance times, are told strong agreement exists in the way the group sets goals. Our experimental procedure did not successfully prevent intermember communication in this treatment, and the results could not appropriately be compared with those of the preceding treatments. However the X treatment produced the unanticipated finding that communication among members can create uniformity of satiation level within a group, either in the direction of raising the level or lowering it.

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## Appendix A

Experimental InstructionsI. Introduction

I'm going to read these instructions to you since they are a bit complex. We work with a lot of different groups, and we want to be sure they all get the same information in the same order.

Read with treatment	Omit with treatment	
E	ABCD	a. We've asked you to come as a group from your fraternity because we want to see how fraternity people work on an unfamiliar task as compared with groups of people just assembled at random.
ABCDE		a'. This (morning) (afternoon) (evening) you'll be working as a group on this jig-saw puzzle, (POINT TO PUZZLE ON TABLE) using these sticks you see in the booths to put the figure together a number of times
BCDE	A	b. We have two main purposes for this study. First we want to see how realistic people are in setting goals to shoot for as they practice this puzzle on successive trials. Secondly, we want to find out how people feel about doing the same thing repeatedly, so we will have you work on this one puzzle all during the session.
A	BCDE	b. We have one main purpose in this study, namely, to find out how people feel about doing the same thing repeatedly, so we will have you work on this one puzzle all during the session.
BCDE	A	c. Your performance is scored on two things: one, how fast you get the picture assembled, and two, how well you fit the pieces into the outline.
BCDE	A	d. Scores range from 0% to 100%; 0 is the worst score and 100 the best. A score of 50 is average for college students.



Read with treatment	Omit with treatment	
BCDE	A	e. Now we are not primarily interested in your performance as such -- (whether, for example, you get scores of 25% or 75%) but rather we want to see whether you can use your impressions of your performance to set realistic or reasonable goals to shoot for.
BCDE	A	f. We expect that people will find it hard to set realistic goals in this kind of a situation just as it is sometimes difficult to do in everyday life. You will have to strike a balance between speed and accuracy as factors important in setting realistic goals about performance. Now each person here, depending on his experience and temperament, will have his own individual ideas about reasonable goals; therefore we will report your performance score on the first trial and the first trial only, so that you will all have the same reference point to start from in setting your goals. After the first trial you won't have any objective information about performance so you won't be able to tell whether or not your goals are unreasonable ones which just reflect your own private feelings.
ABCDE		g. In some groups we work with we have a different method of procedure, and we ask them to leave their watches with us while they're working. So to keep conditions comparable, we'd like to ask you to hand your watches to Mr. _____. May we pick them up now? We'll return them right after the session.
BCDE	A	h. O.K. As I said, we'll give you your score on the first puzzle only, and before each succeeding trial we will ask you what score (or goal) you expect the group to achieve.....
CDE	AB	i .....and then we will tell you each time how much the people in this group agree or disagree on the goals they set for the next trial. Since you won't have any objective information about your performance, after the first trial, essentially the only way you can tell

Read with treatment	Omit with treatment
------------------------	------------------------

ABCDE

whether your judgment is more or less reasonable is by how closely the goal you set agrees with the judgments that the other people in the group are making, and we'll let you know about this each time.

- j. Besides seeing whether it's possible to set reasonable goals, (for treatment A substitute for preceding, "As I said,") we want to find out how people react to working time after time on this same task. We know that if anybody works often enough on something it can get pretty distasteful, and some types of repetitive jobs get more boring and distasteful than others. We want to see how boring this particular task gets, and we'll ask you after each trial to jot down your feelings about it.

Any questions on this?

O.K. Let's take our chairs to the table, and I'll explain the rules and procedure to you. Just take any place.

## II. Demonstration and Explanation of Rules

Read with treatment	Omit with treatment
------------------------	------------------------

ABCDE

- a. There are a few simple rules to follow in assembling the picture.

ABCDE

- b. First of all, you're supposed to follow the sequence indicated by the number in the spaces. That is, section 1 is to be filled in first, section 2 next, etc.

ABCDE

- c. Secondly, all five people must be working on the same piece at the same time. That is, all five sticks must be touching the same piece while it's being placed.

ABCDE

- d. Thirdly, you should get all pieces approximately in place on the outline before you trim up the figure. When you're making these final adjustments then it's o.k. for you to hold down an adjoining piece so as not to knock it out of place.

Read with treatment	Omit with treatment
------------------------	------------------------

ABCDE

ABCDE

ABCDE

ABCDE

ABCDE

- e. Finally, there must be absolutely no talking during the test. We realize this makes the task very artificial, but if you talk the test loses comparability, and we can't use the results. So to avoid wasting this session please keep from making sounds or any other signals.
- f. O.K. Any questions? ....Any questions at all?
- g. Let's do this puzzle once now to get the rules down and to give you a score as a reference point. After this I'll explain the forms at your workplaces. Would you start work, please?
- h. (During tryout, if any subject is spending time adjusting a piece before others are placed) Remember, you're supposed to get pieces roughly in place, and make your adjustments later.
- i. (As soon as one person begins to withdraw his stick) O.K. When you're finished, return the sticks under the tacks.

### III. Explanation of Forms

Read with treatment	Omit with treatment
------------------------	------------------------

BCDE

A

A

BCDE

- a. Now I'd like to explain how to fill in the forms which you see at your workplace. Please don't write on them until I tell you to fill them out. You use these forms to jot down your goals for the trial coming up and your feelings about repeating this puzzle. You're supposed to fill out one of these forms each time we repeat the puzzle, and we'll collect them each time you fill them out.
- a. Now I'd like to explain the forms at your workplaces. Please don't write on them until we tell you to fill them out. You will use these forms to indicate your feelings about the puzzle as you work on it. You're supposed to fill out one of these forms each time you repeat the puzzle, and we'll collect them each time you fill them out.

Read with . Omit with  
treatment treatment

BCDE	A	b. Let's look at question No. 1. This has to do with the goal setting we talked about earlier. Here we ask you what score you expect the group to achieve on the next trial. Now for a reference point I'll give you the score you made on this demonstration trial which you've just finished. Your score was 46%. Now would you write what score you expect the group to get on the next trial?
BCDE	A	c. Now as Mr. _____ collects the forms, he will compare the goals you have written down, and we'll announce to you how close together or far apart you are in the way the different people here have set goals.
BCDE	A	d. You'll notice on the left side of the booth a chart <sup>1/</sup> which can help you to see how much agreement or conflict there is in your group. Will you look at the chart? If we announce unusually good agreement, it means you're all within five points of each other, good agreement means you're within 10 points, etc. Then on the conflict side of the scale, it goes all the way down to unusually strong conflict, which means that the goals in the group are very far apart, more than 30 points apart from each other.
BCDE	A	e. Now, how can you interpret this? If the group is on the agreement side of the scale, you can be pretty sure that your own goal is a reasonable one in terms of how the others see it. If the group is on the conflict side of the scale, there is a greater probability that your own goal is an unreasonable one. We can tell you from experience that once you get into the conflict side of the scale and stay there for two or three times it means that the people in this group are very different from each other in the way that they set goals. Once you find that you're on the conflict side of the scale for, say, three times in a row, we can assure you on the basis of experience that you are different enough from one another that it is hardly worth trying to get back into the agreement side.
BCDE	A	f. O.K. Then after we pick up the forms we'll tell you how much you agree with each other on the goals you just set. And you can use this information to try to set reasonable goals.

<sup>1/</sup> See appendix B.

Read with treatment	Omit with treatment	
BCDE	A	g. Now, let's look at the second question. It's pretty straightforward. Just circle the letter to show how reasonable you think this goal is that you've just put down. Would you do that, please?
BCDE	A	h. Now, let's look at No. 3. This refers to your feelings about the puzzle as you work on it.
ABCDE		i. We are trying to determine how much boredom this kind of puzzle creates as you do it over and over again. Most groups go through a sequence of feelings which starts with (a) on the scale, "at least some interest in repeating the puzzle", goes through (b), (c), (d), (e), finally reaching the feeling, (f), that the task is "Intensely distasteful"--in other words, that people feel a great desire to stop.
ABCDE		j. Now, just to set up the routine, use the way you feel now as a point of reference and circle the letter (a) at the bottom of the form. Have you all done that? O.K., as you get more and more bored with this puzzle, you should circle b, c, d, e, f, going from less extreme to more extreme distaste with the task. Don't hesitate to use any letter on the scale. We need an accurate indication of your feelings about repeating this kind of puzzle, so please be frank about your feelings as you go along.
ABCDE		k. Again, we want to caution you to be quiet, so as not to influence other members. We want each member's feelings about the task to be independent of anybody else's. So please avoid groans, sighs, drumming fingers, etc. You should refrain from making any expression of feelings whatsoever.
ABCDE		l. Any questions? (No questions aloud once we start the actual trials.)
BCDE	A	m. O.K., to summarize: In this situation it's extremely hard to set reasonable goals. To set reasonable goals, people ordinarily need to know, one, how well they are doing, and, two, how other people are setting goals.

Read with.. treatment	Omit with treatment	
B	A CDE	n. In this situation you won't get either type of information--so you will not be able to make any sort of check on whether your goals are reasonable or whether they just reflect your own private feelings.
CD	AB E	o. In this situation we'll tell you whether people agree with one another--so you will be able to make one check on whether your goals are reasonable or whether they just reflect your own private feelings.
E	ABCD	p. In this situation you will get both types of information--so you will be able to check on whether your goals are reasonable or whether they just reflect your own private feelings.
ABCDE		q. Now will you be sure to put your booth number on each form? Please hang up the forms on the nails at the side of your workplaces. They will be collected after each trial.
CDE	AB	r. And we'll then tell you how close together or far apart the group is on the goals for the next trial.

#### IV. Standard form of experimenter's announcements during the trials

- a. (After group finishes each puzzle). "O.K., will you fill out the forms, please?"
- b. (After the experimenter disassembles a completed puzzle). "O.K., go ahead, please."

#### V. Standard form of assistant experimenter's announcements (Note: these announcements are made only in C, D, and E treatments)

- a. (After demonstration trial). "The goals you set for the next trial show that you're in good agreement on the scale.

If you look at the chart, you'll see that you're all within 10 points of each other.

This means that you can be pretty sure that your individual goals are reasonable ones."

- b. (After trial 1). "The goals you set for the next trial are in moderate conflict on the scale. In other words you're within 25 points of each other."

This means that there is a good probability that your individual goals are unreasonable."

- c. (after trial 2). "The goals you set for the next trial are in [strong conflict (if treatment C), good agreement (if treatment D or E)] . You can refer to the scale from now on to see how many points apart you are; I won't bother to repeat that each time."
- d. (After each successive trial). "The goals you set for the next time are in [insert conflict-agreement announcement] ."

- e. Sequence of agreement-conflict announcements beginning with trial 1:  
 (Symbols: UGA = Unusually good agreement; GA = good agreement;  
 FA = fair agreement; MC = moderate conflict; SC = strong conflict;  
 USC = unusually strong conflict.)

1. For treatment C:

<u>Trial</u>	<u>Announce - ment</u>	<u>Trial</u>	<u>Announce - ment</u>	<u>Trial</u>	<u>Announce - ment</u>
1	MC	21	USC	41	SC
2	SC	22	SC	42	MC
3	MC	23	USC	43	SC
4	SC	24	MC	44	USC
5	MC	25	SC	45	SC
6	SC	26	USC	46	USC
7	USC	27	SC	47	MC
8	SC	28	USC	48	SC
9	USC	29	MC	49	MC
10	MC	30	SC	50	USC
11	SC	31	SC	51	USC
12	SC	32	USC	52	USC
13	USC	33	MC	53	MC
14	MC	34	USC	54	MC
15	USC	35	SC	55	MC
16	MC	36	USC	56	USC
17	USC	37	USC	57	USC
18	USC	38	SC	58	SC
19	USC	39	MC	59	MC
20	MC	40	USC	60	MC



## 2. For treatments D and E:

<u>Trial</u>	<u>Announce- ment</u>	<u>Trial</u>	<u>Announce- ment</u>	<u>Trial</u>	<u>Announce- ment</u>
1	MC	21	GA	41	GA
2	GA	22	UGA	42	FA
3	FA	23	GA	43	GA
4	UGA	24	UGA	44	UGA
5	GA	25	UGA	45	FA
6	FA	26	FA	46	UGA
7	GA	27	GA	47	GA
8	UGA	28	UGA	48	UGA
9	FA	29	FA	49	FA
10	UGA	30	UGA	50	GA
11	GA	31	GA	51	GA
12	UGA	32	UGA	52	UGA
13	FA	33	FA	53	UGA
14	GA	34	GA	54	GA
15	GA	35	GA	55	FA
16	UGA	36	UGA	56	GA
17	UGA	37	UGA	57	UGA
18	GA	38	GA	58	UGA
19	UGA	39	UGA	59	GA
20	FA	40	UGA	60	GA

## Appendix B

Chart Posted in Each Booth Explaining  
the Agreement-Conflict Announcements  
(Used only for treatments C, D and E)

How reasonable are the goals you are setting?

(As compared to the goals being set by the others in the group)

Agreement-Conflict Scale

Unusually good agreement:	all <u>WITHIN 5 POINTS</u> of one another (or 3 identical, 2 within 10 points)
Good agreement:	all <u>WITHIN 10 POINTS</u> of one another (or 2 identical, 3 within 15 points)
Fair agreement:	all <u>WITHIN 10 POINTS</u> of one another
Average agreement:	all <u>WITHIN 20 POINTS</u> of one another
Moderate conflict:	all <u>WITHIN 25 POINTS</u> of one another
Strong conflict:	all <u>WITHIN 30 POINTS</u> of one another
Unusually strong conflict:	goals <u>MORE THAN 30 POINTS</u> apart

## Appendix C

Forms Filled Out After Each Trial

Form Used in Treatment A

Booth No. \_\_\_\_\_

1. How do you feel about doing this particular task again?  
(Circle the letter at the bottom of the sheet which  
corresponds to the appropriate statement)

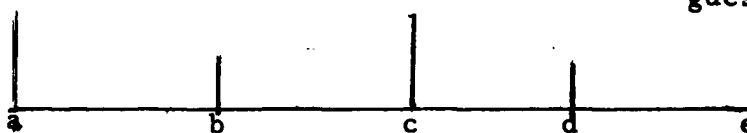
- a. I feel at least some interest in repeating this task.
- b. I feel that repeating the task has lost interest for me.
- c. I feel that repeating the task is somewhat boring for me.
- d. I feel that repeating the task is rather distasteful to me.
- e. I feel that repeating the task is very distasteful to me.
- f. I feel that repeating the task is intensely distasteful to me.

a   b   c   d   e   f

## Form Used in Treatments B, C, D, and E.

Booth No. \_\_\_\_\_

1. On the next trial, the goal I expect the group to achieve is \_\_\_\_\_.
2. How sure do you feel that this goal is a reasonable one?  
(Circle the letter which corresponds to the appropriate statement)

Very  
sureNot too  
sureActually  
just a  
guess

3. How do you feel about doing this particular task again?  
(Circle the letter at the bottom of the sheet which corresponds to the appropriate statement)

- a. I feel at least some interest in repeating this task.
- b. I feel that repeating the task has lost interest for me.
- c. I feel that repeating the task is somewhat boring for me.
- d. I feel that repeating the task is rather distasteful to me.
- e. I feel that repeating the task is very distasteful to me.
- f. I feel that repeating the task is intensely distasteful to me.

a   b   c   d   e   f

## **Appendix D**

### **Post-Experiment Questionnaires**

1. Questionnaire used in Treatments A and B.
2. Questionnaire used in Treatments C, D, and E.

1. Questionnaire used in treatments A and B

Booth No. \_\_\_\_\_

**Your Reactions to this Test (A, B)**

1. Write here your estimate of the number of times your group assembled this picture. \_\_\_\_\_
  
2. We would like to know what sorts of things, if any, people think about as they work in this situation. Could you describe in some detail the sorts of things you were interested in or thinking about as you worked on the puzzles?
  
3. There are many different things that people might focus on in working on these puzzles. To what extent was your own interest focused on improving the efficiency of performance as you worked on these puzzles?

Tried to do this continually

Tried to do this frequently

Tried to do this from time to time

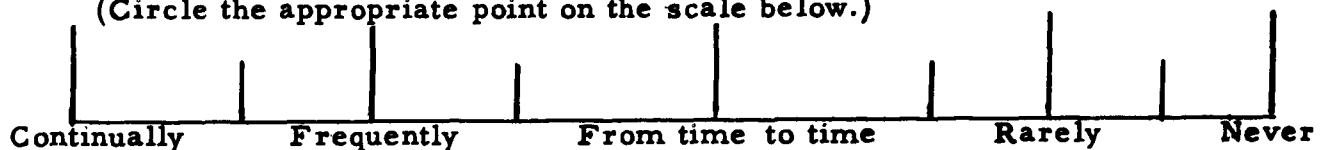
Tried to do this at first, but stopped after a while

Never tried to do this

Other: (Please explain)

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

4. To what extent did you find yourself doing or thinking about things not directly connected with the puzzles as you continued working on them?  
 (Circle the appropriate point on the scale below.)



Please describe the kind of thing(s) you were thinking about:

- 5a. You will remember that you indicated before each trial how you felt about repeating the puzzle. What does the phrase "intensely distasteful", which appeared on the scale dealing with your feelings, mean to you?

Please explain:

- 5b. Did you have any hesitation in using the statement that "repeating the puzzle is intensely distasteful"? ☐ Yes

☐ No

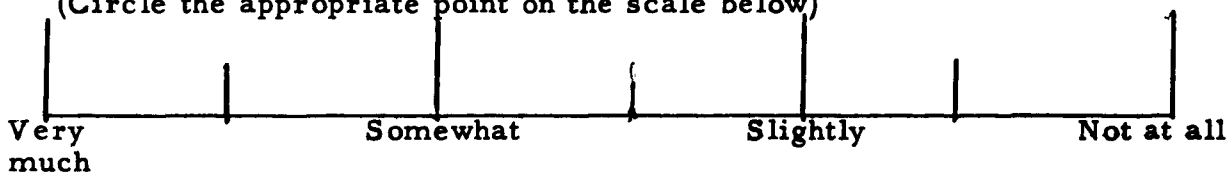
Please explain:

6. As you worked on these puzzles did you notice any symptom of physical discomfort? (Including aches, pains, tiredness, yawning, etc.) ☐ Yes

☐ No

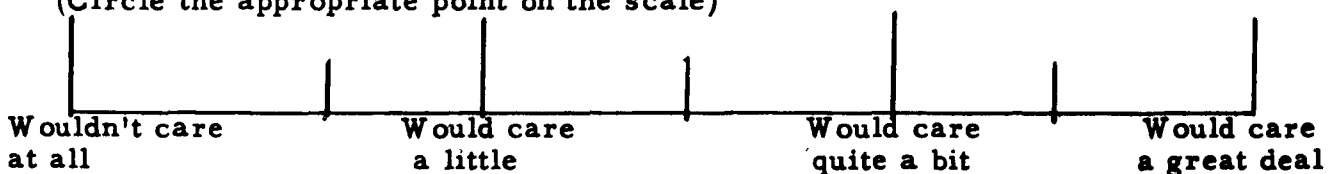
Please describe any such symptoms:

7. To what extent did you want this group to do well on this task?  
(Circle the appropriate point on the scale below)



Please explain:

8. If the group did not do well on the task, how would you feel about it?  
(Circle the appropriate point on the scale)



Please explain:

2. Questionnaire used in treatments C, D and E

Booth No. \_\_\_\_\_

## Your Reactions to This Test (C, D, E)

1. Write down your estimate of the number of times your group assembled this picture. \_\_\_\_\_
2. What is your estimate of the average amount of agreement or conflict announced for this group over all puzzles? Check the average point for your group on the scale provided below.

Check one here

1. Unusually good agreement
2. Good agreement
3. Fair agreement
4. Average agreement
5. Moderate conflict
6. Strong conflict
7. Unusually strong conflict

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

3. We would like to know what sorts of things, if any, people think about as they work in this situation. Could you describe in some detail the sorts of things you were interested in or thinking about as you worked on the puzzles?
- 4a. There are many different things that people might focus on in working on these puzzles. To what extent was your own interest focused on increasing the amount of agreement which was announced for your group? (Check the appropriate statement)

- Tried to do this continually
- Tried to do this frequently
- Tried to do this from time to time
- Tried to do this at first, but stopped  
after a while
- Never tried to do this
- Other: (Please explain)

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



4b. To what extent was your own interest focused on improving the efficiency of performance as you worked in these puzzles?

**Tried to do this continually**

**Tried to do this frequently**

Tried to do this from time to time

Tried to do this at first, but stopped  
after a while

**Never tried to do this**

**Other: (Please explain)**

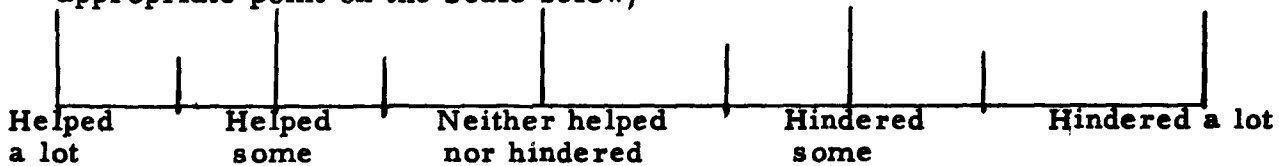
4c. To what extent did you find yourself doing or thinking about things not directly connected with the puzzles as you continued working on them?

(Circle the appropriate point on the scale below)



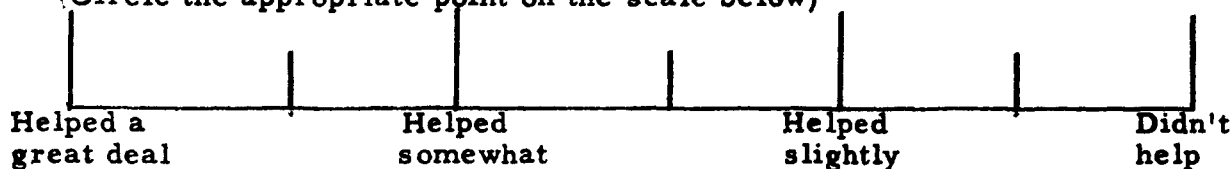
**Please describe the kind of thing(s) you were thinking about:**

5. Did the announcement before each trial of where the group stood on the scale help or hinder you in setting your own goals? (Circle the appropriate point on the scale below)



**Please explain why the announcements helped or hindered you.**

6. Did the announcements of where the group stood on the scale of agreement or conflict help in any way to keep you from getting bored?  
(Circle the appropriate point on the scale below)



Please explain:

- 7a. You will remember that you indicated before each trial how you felt about repeating the puzzle. What does the phrase "intensely distasteful", which appeared on the scale dealing with your feelings, mean to you?

Please explain:

- 7b. Did you have any hesitation in using the statement that "repeating the puzzle is intensely distasteful"? \_\_\_\_\_ Yes

\_\_\_\_\_ No

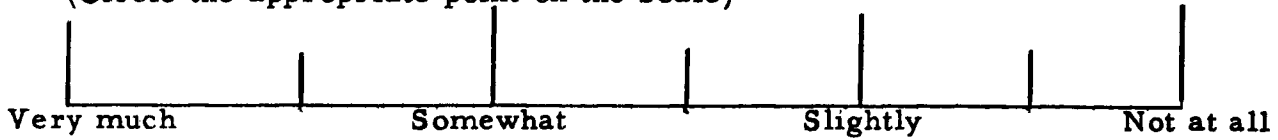
Please explain:

8. As you worked on these puzzles did you notice any symptom of physical discomfort? (including aches, pains, tiredness, yawning, etc.) \_\_\_\_\_ Yes

\_\_\_\_\_ No

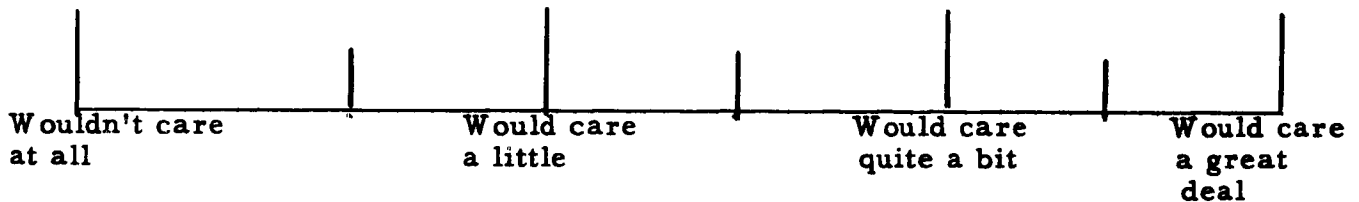
Please describe any such symptoms:

9. To what extent did you want this group to do well on the task?  
(Circle the appropriate point on the scale)



Please explain:

10. If the group did not do well on the task, how would you feel about it?  
(Circle the appropriate point on the scale)



Please explain:

**APPENDIX E****Tables of Basic Data**

Table 25  
Mean Satiation Scores for Individuals  
by Treatment and Group  
for 40 Trials

		Group								
Treatment	Person	1	2	3	4	5	6	7	8	
A	1	5.15	2.38	4.70	2.58	5.00	2.50	2.18	4.60	$\bar{M}_A = 3.54$
	2	5.15	3.08	4.40	2.82	1.48	4.32	3.30	4.28	
	3	3.68	2.75	4.00	5.35	--	5.05	--	--	
	4	1.05	2.35	3.10	3.00	3.20	5.45	1.35	1.00	
	5	5.48	3.02	3.55	4.80	5.60	2.50	3.90	2.72	
B	1	3.00	5.80	2.79	2.02	4.35	1.52	2.02	1.02	$\bar{M}_B = 3.28$
	2	1.92	4.92	5.10	5.10	1.12	3.75	2.90	2.30	
	3	5.28	3.40	5.35	3.18	2.78	1.38	4.78	1.88	
	4	2.10	3.50	--	--	2.28	4.55	2.72	3.62	
	5	2.88	3.38	4.82	4.95	3.25	2.70	2.08	4.10	
C	1	4.28	1.00	3.22	3.38	3.52	4.38	5.60	3.10	$\bar{M}_C = 3.07$
	2	2.48	3.70	2.10	3.32	1.00	2.88	3.65	3.10	
	3	3.02	2.28	1.00	1.00	1.78	3.95	--	2.30	
	4	5.50	3.38	2.82	--	3.62	--	5.15	3.95	
	5	2.65	1.92	5.00	4.75	4.22	2.38	1.00	1.30	
D	1	2.80	1.38	1.98	2.02	1.00	2.52	4.28	1.98	$\bar{M}_D = 2.85$
	2	1.00	3.05	2.68	1.58	2.58	3.70	2.62	4.10	
	3	3.62	4.20	4.02	1.35	3.52	--	1.38	4.45	
	4	--	--	2.90	2.38	--	3.00	5.40	4.48	
	5	2.60	3.22	--	3.02	1.70	3.32	2.20	3.68	
E	1	3.62	1.35	4.78	1.00	3.00	1.48	2.28	1.00	$\bar{M}_E = 2.48$
	2	1.72	1.00	4.92	2.80	2.90	1.00	3.02	2.22	
	3	1.00	5.20	1.68	4.02	--	1.12	2.25	3.02	
	4	2.72	3.70	2.85	2.62	1.80	1.15	1.02	2.72	
	5	3.35	1.82	4.90	2.68	1.42	1.48	4.62	1.60	

Table 26  
Mean Decision Scores for Individuals  
by Treatment and Group  
for 40 Trials

		Group									
Treatment	Person	1	2	3	4	5	6	7	8		
B	1	2.45	2.28	2.92	1.28	3.80	2.28	2.42	2.00	$\bar{M}_B = 2.56$	
	2	2.22	1.82	1.80	3.08	2.95	2.62	2.05	2.25		
	3	3.10	2.15	2.52	2.60	3.30	2.95	3.42	2.52		
	4	3.10	2.45	--	--	2.72	2.80	2.25	2.00		
	5	2.68	2.48	3.28	4.02	2.40	2.95	1.88	1.48		
C	1	2.72	2.00	3.48	2.92	3.00	4.28	2.00	2.20	$\bar{M}_C = 2.73$	
	2	3.05	1.50	1.92	4.50	2.30	1.92	2.38	2.70		
	3	2.38	3.40	3.02	1.30	2.35	1.92	--	4.05		
	4	2.78	3.10	2.10	--	2.18	--	2.62	2.62		
	5	2.62	3.22	2.98	3.75	4.18	3.75	1.92	2.05		
D	1	1.38	2.08	3.95	2.00	2.20	2.48	1.62	2.30	$\bar{M}_D = 2.18$	
	2	2.05	3.90	1.75	2.02	2.08	2.10	3.00	1.42		
	3	2.22	2.78	2.58	1.60	2.02	--	1.20	1.20		
	4	--	--	1.65	1.72	--	2.20	3.30	2.98		
	5	1.78	2.25	--	2.15	2.02	2.35	2.08	2.00		
E	1	2.75	1.40	2.80	1.28	1.88	1.40	1.98	2.00	$\bar{M}_E = 1.94$	
	2	1.52	2.30	1.20	5.00	1.18	1.22	2.45	1.40		
	3	1.90	2.00	2.40	2.55	--	2.00	2.02	2.02		
	4	1.92	2.62	2.95	2.28	1.75	1.68	1.02	2.05		
	5	1.88	1.28	1.92	1.50	1.35	1.15	1.58	2.02		

Table 27

Mean Loss of Contact Scores for  
Individuals by Treatment and Group  
for 40 Trials

		Group							
Treatment	Person	1	2	3	4	5	6	7	8
B	1	15.38	23.81	22.73	20.00	9.09	8.33	21.43	28.57
	2	38.46	14.29	18.18	10.00	9.09	25.00	21.43	14.29
	3	23.08	14.29	13.64	20.00	27.27	33.33	21.43	21.43
	4	23.08	19.05	---	---	18.18	41.67	7.14	28.57
	5	11.54	14.29	4.54	30.00	9.09	16.67	14.29	28.57
C	1	25.00	00.00	25.00	33.33	26.67	20.00	33.33	00.00
	2	00.00	55.56	12.50	38.89	26.67	10.00	25.00	25.00
	3	15.00	11.11	50.00	22.22	13.33	5.00	--	20.00
	4	15.00	00.00	12.50	--	26.67	--	8.33	30.00
	5	25.00	33.33	12.50	5.56	6.67	35.00	41.67	15.00
D	1	29.41	15.38	00.00	00.00	18.18	15.79	5.00	00.00
	2	23.53	7.69	6.67	00.00	4.54	26.32	00.00	7.14
	3	23.53	23.08	26.67	41.67	18.18	--	10.00	35.71
	4	---	---	6.67	00.00	--	5.26	15.00	21.43
	5	41.18	7.69	---	00.00	00.00	10.53	10.00	7.14
E	1	5.00	40.00	00.00	13.33	00.00	8.33	13.33	00.00
	2	15.00	55.00	00.00	00.00	00.00	00.00	6.67	8.33
	3	15.00	50.00	12.50	00.00	---	8.33	6.67	00.00
	4	45.00	30.00	00.00	6.67	00.00	00.00	13.33	00.00
	5	5.00	35.00	25.00	00.00	00.00	00.00	13.33	00.00
Treatment Means		B		C		D		E	
		19.51		20.56		13.24		11.05	

**Table 28**  
**Mean Goals for Individuals by**  
**Treatment and Group**  
**for 40 Trials**

		Group							
Treatment	Person	1	2	3	4	5	6	7	8
B	1	81.26	61.25	55.57	74.19	39.34	82.10	56.96	71.19
	2	67.50	72.46	66.00	52.65	57.92	45.18	58.44	58.07
	3	78.21	56.04	50.73	55.83	43.64	64.98	62.67	70.19
	4	80.19	77.54	--	--	49.00	56.35	65.20	67.18
	5	49.38	70.06	52.64	52.65	50.36	80.20	86.93	46.75
C	1	86.35	70.61	73.80	57.44	70.51	57.95	64.61	66.50
	2	61.46	26.26	77.25	60.42	66.22	84.20	67.45	56.35
	3	81.62	60.33	72.61	65.58	66.56	83.30	---	68.85
	4	64.04	68.58	85.84	---	56.91	--	71.63	54.58
	5	65.12	62.98	71.78	65.65	72.31	70.84	56.35	64.04
D	1	90.98	51.58	56.42	81.70	81.30	73.59	54.30	77.27
	2	68.95	71.22	90.58	87.21	84.19	61.41	82.79	74.07
	3	69.25	57.50	50.25	36.58	62.16	---	80.30	73.66
	4	---	---	81.08	59.96	---	86.70	92.02	74.30
	5	54.88	70.72	--	96.46	67.44	77.96	81.49	90.43
E	1	76.78	86.33	86.39	87.75	80.68	93.46	70.82	68.52
	2	79.80	84.18	70.78	88.79	64.32	76.82	83.94	88.80
	3	91.80	85.35	63.94	72.64	---	76.14	63.14	71.68
	4	74.22	74.49	79.02	83.57	87.88	83.30	84.14	81.95
	5	80.76	78.51	84.80	86.32	68.58	71.25	73.47	76.35
Treatment Means		B		C		D		E	
		62.68		66.94		72.87		79.06	



Table 29  
Mean Score for Individuals in the  
X Treatment on the Major Variables

Variable	Person	Group								
		1	2	3	4	5	6	7	8	
Satiation	1	4.70	1.00	1.48	4.98	1.22	3.98	4.42	2.12	<u>M</u> = 2.90
	2	2.12	2.60	3.65	3.10	1.02	2.98	4.82	2.98	
	3	4.00	3.10	1.00	2.38	1.02	--	3.28	2.30	
	4	4.52	1.18	2.75	5.22	1.00	1.60	4.18	2.95	
	5	5.00	1.70	4.18	3.90	1.82	2.85	2.90	2.92	
Decision	1	1.45	2.28	1.32	4.78	2.25	1.05	1.50	2.00	<u>M</u> = 1.91
	2	2.02	2.95	1.40	2.00	2.32	1.05	1.32	2.32	
	3	1.85	1.12	2.02	2.42	1.95	--	1.30	2.30	
	4	1.98	3.00	1.50	1.38	3.08	1.48	1.92	1.08	
	5	1.30	1.60	1.25	2.72	1.50	2.50	2.25	1.05	
Loss of Contact	1	11.76	00.00	25.00	34.62	50.00	10.10	9.09	23.08	<u>M</u> = 13.07
	2	00.00	23.08	6.25	7.69	30.00	00.00	22.73	15.38	
	3	29.41	15.38	6.25	00.00	00.00	--	00.00	30.77	
	4	35.29	15.38	12.50	00.00	10.00	00.00	9.09	00.00	
	5	11.76	15.38	00.00	11.54	20.00	00.00	18.18	00.00	
Goal	1	82.38	88.10	77.22	68.29	64.08	57.04	82.51	82.62	<u>M</u> = 73.97
	2	80.75	72.10	79.83	70.00	93.84	91.56	76.56	55.70	
	3	55.25	84.13	74.33	49.79	64.92	---	68.21	63.10	
	4	80.20	80.08	79.83	78.38	54.36	81.38	88.73	63.90	
	5	80.00	84.36	59.83	62.79	89.23	80.56	70.93	67.98	

Table 30  
Mean Time Scores per Trial for All  
Groups over 40 Trials

Group	Treatment					
	A	B	C	D	E	X
1	1.87	1.47	1.17	1.15	1.04	1.33
2	1.42	1.29	.89	.98	.98	.80
3	1.15	1.38	.92	1.08	1.00	.93
4	1.28	1.30	1.31	1.03	1.06	1.72
5	.94	.89	1.18	1.38	.69	.78
6	1.55	1.07	1.20	1.19	.83	1.19
7	1.38	1.02	1.10	1.26	.98	1.25
8	1.30	.96	1.12	1.25	.82	1.07
Grand Mean	1.36	1.17	1.11	1.16	.92	1.13

Table 31  
Mean Placement (Inaccuracy) Scores per  
Trial for All Groups over 40 Trials

Group	Treatment					
	A	B	C	D	E	X
1	2.19	2.99	4.46	3.61	6.98	3.24
2	1.86	5.19	4.04	3.20	3.21	3.51
3	4.54	3.04	3.06	3.19	5.31	3.12
4	3.06	3.19	3.09	3.34	4.64	4.20
5	4.44	3.19	3.24	2.62	5.46	4.91
6	4.18	4.48	3.34	3.42	7.80	4.70
7	4.16	2.22	3.98	4.15	3.75	4.65
8	4.14	4.96	4.79	4.09	3.68	3.35
Grand Mean	3.57	3.66	3.75	3.45	5.10	3.96